

THE IRON AGE

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BUSINESS—What Factors Condition Its Recovery?

CERTAIN economists confidently declare that they can prophesy moderately ahead as unerringly as the astronomer foretells an eclipse of the moon. Rather than with astronomy their analogy ought to be with meteorology.

The science of prophetic meteorology boils down to the knowledge that in this hemisphere most storms originate in the West and generally move eastward and may be outstripped a few days by the telegraph. But they do not always follow a regular course and besides that no one knows just what starts them.

We are almost as ignorant of the starting of an economic depression, until long afterward the historians review conditions. For practical guidance we know scarcely more than that they occur every now and then and later dissipate in more or less the same way. Our optimism at the present moment is chiefly based on such historical precedents, and the statistics that we so eagerly scan are examined for symptoms rather than reasons.

INDUSTRIAL depressions may start from overbuilding, from adversities of nature, from overstraining of credit, from warfare, from general bad habits of living, from political discontent, from social movements, and probably from other causes, two or more of which may be acting in conjunction.

At the present time we are passing through a world-wide depression from which France alone among the major countries appears to have escaped. We dismiss Russia, which is trying a new kind of economy.

Thinking only in terms of the United States, we believe that our troubles arise from an overprovision of goods, which follows from overproduction, which may follow from overmechanization, and so on like the house that Jack built, all of which may be true without getting to the roots of things.

In exploring for them we come always to consequences of the Great War, which still enmesh the world in many ways. More immediate roots are to be found in the turmoil in the Orient and the unrest in South America. The trouble brewing in India has played the mischief with British trade. The quarreling in China has brought Japan to the verge of ruin and has had a serious, direct effect on American export trade.

OUR national economy is complicated and is subject to derangement by only slight alterations of conditions.

In the aggregate we probably carry about a ten-month supply of goods. A plus or minus of one-month supply may have a profound effect. If plus, there may be such halts in production to permit depletion as occurred in 1921 and 1930, and there may be a subnormal employment of workers to the extent of 10 per cent. After the liquidation of stocks has been completed replenishment of them is inspired by low prices.

This is merely an explanation of the historical observation that severe depressions run about 12 months in their downward movement and perhaps another 12 months in the return.

Business miscalculations frequently cause minor domestic depressions, as in 1924 and 1927. When there is superimposed the effect of concurrent foreign adversities, affecting our export trade, there is aggravation, as in 1921 and 1930.

While, therefore, we may now reasonably expect an early restoration of our domestic balance, plus the benefit of our natural growth in population and increase in consumptive demand, we should not anticipate regaining a full measure of activity until situations abroad have materially improved, which will involve adjustments quite different from our own.



EDWARD B. POLLISTER, president and general manager of the Busch-Sulzer Brothers-Diesel Engine Co., was born in Portland, Me., in 1884. After attending Massachusetts Institute of Technology, he entered the engineering department of the New York Edison Co. His first professional contact with Diesel motors took place some four years later with the National Light, Heat & Power Co., for which he supervised the construction of power plants in Illinois. During the war Mr. Pollister served two years in the U. S. Army, and was captain, 319th Engineers, with 11 months overseas service.

INTELLIGENT COST WORK WILL AID RECOVERY

DURING the present depression, your program to devote editorial space to emphasizing the value of cost data will be of value in guiding the path of recovery along economic lines.

The lesson of a thin distribution of overhead over the abnormal volume of output made possible by recent years of prosperity has been so well learned that the present reach for continued volume, at the expense of destructive price cutting, has taken the place of the saner economic reduction of operations to meet the reduced demand. For other than mass production methods, cost finding becomes more important in price making, and in such industries as ours, where we build rather than manufacture, while we do consider past costs more or less as water over the dam, we carefully compile and use these costs to guide toward lower cost designs. In this way, we use historical costs to create in advance future objective costs. This use of past costs compels consideration of why costs are high and imposes the

obligation of meeting a reduction in such costs before the work is undertaken.

Herein lies the greatest value of cost data. Unwise competition during dull periods may be wisely met by soundly establishing lower future costs in advance to meet price cutting. Unreasonably low price competition will then be the urge for effort toward greater productivity and build up on an economically sound basis a greater value for the merchandise dollar, which will leave the manufacturer who stays closely to cost finding more firmly established after a depression than before; while his competitor, who has thrown costs to the four winds in seeking for volume without regard to cost, will emerge in a weakened condition to compete on the return of prosperity.

Edward B. Pollister

Modern Cost Work Shows Its Profit Possibilities

By JOHN H. VAN DEVENTER

*Industrial Consultant
The Iron Age*

THE reversal in the trend of business which began over a year ago has produced certain effects in the machinery and metal-working industry. The most obvious of these is the general reduction in volume, resulting in difficulty in maintaining the profit margin. A secondary effect is the stimulus to managerial effort caused by the need of taking steps to adequately meet this situation.

An intensive period of questioning methods and policies is the result of this new competition introduced by decreased volume. Executive thought is now centered on the reduction of manufacturing costs and general overhead rather than on building up big production volumes and quickening the capital turnover. Profit today must be made through the skillful multiplication of small economies. Cost and expense reductions form the managerial keynote today and will probably continue to be pursued with keen executive interest for some time to come.

It is logical that cost work and the cost department should receive more executive attention today under these conditions than they did during the "boom" period. The cost department is the one place in the industrial plant to which all operating statistics gravitate. Cost saving ideas and suggestions should flow out of it just as operating statistics flow in.

But whether the cost department becomes a cemetery for the interment of statistics or an incubator of usable ideas depends on what the management asks of it and how well it is equipped, in initiative and ability, to live up to these demands.

It is nothing new for a well-conducted cost department to prepare reports for the purpose of executive control or to call attention to jobs on which material and labor have run above or below past averages,

EXISTING performance standards will not serve under present-day competitive conditions; hence, routine cost reports established on such standards are not sufficient. The cost and expense data must be made to reveal the possibilities of new economy.

¶ To this end progressive companies are shaping their cost work toward more effective executive control; equipping it with personnel having suitable initiative and plant experience and demanding suggestions and surveys beyond and above what was formerly required by routine.



standards or estimates. Nor is it a new thing for the cost department to provide a periodic report covering the various items of overhead expense with percentages which indicate their relations and trends. These things, however, are what one might call matters of ordinary routine, expectable under any circumstances just as it is to be expected that the cost record files shall be properly maintained, accurate and up to date.

But a much greater degree of constructive service is required as an aid to management today. The cost department can supply this if it is organized to display initiative beyond the re-

quirements of mere routine.

The experience of a midwestern metal-working plant executive is typical of progressive management's new attitude toward cost work as an aid in meeting today's competitive conditions.

"Shortly after the big market break," said this executive, "our volume dropped to a level that would wipe out all profits under existing operating conditions. Seeing no likelihood of any immediate upturn, I decided to go over our organization, department by department, and see what economies could be found to offset the shrinkage in production volume.

"Our cost department, from the statistical standpoint, was probably as well equipped as such a department could be and its records were in good order. I naturally turned to it as the most centralized source of information and ideas.

"Here was a department in our company through which all plant activities passed in statistical review. Every item of cost and expense, every dollar spent in operation passed through it as through a sieve. The big lumps that would not pass through the mesh, so to speak, stood out and were reported to the proper

executive. It should have been a wonderful source of help to me but strangely enough I was unable to get a new and usable idea out of it. I found also upon inquiry among our department heads, that aside from the customary reports and notifications of cost exceptions sent them by our cost department, there had not been one instance during the preceding several months where a usable suggestion had been made of possible ways to cut costs or reduce expenses.

"Our cost department had been living up to what we expected of it in the way of routine reports. But when you are faced with unusual conditions of an emergency nature, statistics and routine devised to meet normal conditions will not necessarily give you the kind of help you want. When established standards of performance will no longer serve, initiative and imagination must come to the rescue rather than routine reports.

"We do not expect that the cost department shall furnish the executive brains of our organization, but I think every plant has a right to expect that with all of the statistics available to it, this department should be made to produce cost saving ideas.

"Our cost department had been under the jurisdiction of the comptroller and came under what we call our administrative office control. It was wrongly hooked up in my opinion since this tended to make it serve as a check-up on the factory management rather than an aid to it. To make it produce ideas from its statistics it was evident that we must introduce additional initiative into the department. We put it under the factory manager and assigned to it one of his assistants, a bright young engineer.

"The idea was to have him live with the cost department for the coming six months and to see what he could do in making the records result in suggestions for action. The overhead expense items were tackled first, as most likely to respond to treatment, since our direct costs were pretty well established and we had no thought of wage reductions.

"Every item of expense was put on the defensive. We thought that we had been splitting our overhead sufficiently for purposes of control, but found that many of the big lumps had to be broken down a good deal more before we could find the waste in them. There is nothing like breaking a thing down to find what is inside of it. Our power charges against departments was one such case.



SUGGESTIVE EXECUTIVE

1. How many suggestions for cost and expense reductions are we getting from our cost departments?
2. Have we got the sort of initiative in our cost department that can be expected to produce ideas as well as statistics?
3. Is it serving as a check on our plant management rather than as a help to it?
4. Have we split up our overhead expense items into small enough pieces for control and reduction?
5. Do we know what our power transmission losses are in each department?

We thought we had this down pretty fine with our recording instruments showing the exact charge against each department.

"As a matter of fact, this told us how much power we were paying for but not how much was going into useful work. So we made a series of tests of power actually consumed with our machines and compared this with what we were putting into each department. A check-up from this angle showed us transmission losses that ran into real money and it would have kept on growing if we had not run them to earth.

"Investment in work in process was another item that we found susceptible to the analysis treatment. When volume of production falls off, the relative cost of work in process, per unit of production, usually goes up. Splitting up this item according to departments showed us that two of these, out of a total of seven, were responsible for 63 per cent of the total. We believe in the principle of first hitting the heads that stick up the highest so we made a drive on the work in process account in these two departments.

"In one of them, we found that a rearrangement of our machines gave a better flow of work and prevented stock piling up between operations. In the other, the installation of a simple overhead stock conveyor resulted from our studies. These two things gave us an even more favorable ratio for this item of work in process than we had formerly had for our normal output. In the other five departments, we were able to make a substantial reduction by keeping after the foremen and making them realize the importance of not keeping material and labor dollars tied up in the factory.

"These are only two of the leads to economies that were the results of our insisting that the cost department should generate cost saving ideas after we had organized it to do so by introducing the necessary initiative and technical knowledge. Similar possibilities for cost and expense reduction are now uncovered nearly every day. These are put down on paper and are gone over twice a week by a committee of our executives.

QUESTIONNAIRE

6. Are we sure we have taken all the slack out of our work in process account?
7. Do we know the idle time of supposedly busy machines—and why?
8. Are we getting the idea of cost and expense reduction over to the foreman?
9. Do our cost reports find and check high costs before the job is completed?
10. Do we put repairs and extensions under cost control or let them "go blind"?

"Once a week the assistant factory manager who is in charge of this cost analysis study has a meeting with our foremen, to get the cost and expense saving idea thoroughly into their heads. Once a week, he meets with the sales executives, in order to keep in touch with price competition and to find out where cost savings can most readily be interpreted in terms of increased sales and markets. In more than one instance, this has led to a complete redesign of one of our products; an initially favorable cost being secured through incorporating, in the new design, parts and materials that were developed comparatively recently.

"We were driven into our new attitude toward cost work by the business depression and the necessity for circumventing it, but now that we know what can be accomplished in the way of worthwhile savings we shall never go back to our old way of being satisfied with routine records and reports."

The experience of this metal-working executive is not an uncommon one today. Hundreds of manufacturers faced with the need of waging a vigorous campaign to keep costs down and expenses from climbing have turned to formerly neglected cost departments as the source of timely suggestions. They are becoming convinced that the ideas which can be obtained from the intelligent study of cost data and from special cost investigations are much more valuable than any routine reports.

Routine, while it does not as a rule establish new standards, helps to maintain those that have already been established. Next to reducing costs and expenses is the matter of keeping them from going up.

While not in any sense a new idea there is a new timeliness today in the thought of applying cost routine so that excessive costs shall be determined and corrected before the completion of the work. This is locking the barn door before the horse is stolen.

The methods used in exercising this sort of control must be shaped to suit conditions in the plant in which it is to be applied. On a continuous run of a large quantity of pieces, the first hour's run of an operation

may be carefully checked against standard time, if a job has been done before or against the estimate if it is a new one. If the cost is found to be higher than anticipated, executive attention is immediately directed to that job to the end that the remainder of the lot may be brought within cost bounds. After that is once accomplished, a daily, twice-daily or hourly check-up thereafter as required will keep the work under control. On contract work involving a considerable number of hours one concern has adopted the practice of having the cost department notify the works management when the accumulated actual hours of work had reached 25, 50, 75 and 100 per cent of the estimates. This gives three opportunities for corrective control during the course of the job and has resulted in considerable cost saving.

Plant repairs, maintenance work and extensions are put under similar cost control by having careful estimates prepared for each important job. The estimates made by the plant engineer's office are turned over to the cost department to be checked up as the work proceeds. Those who have adopted this plan, either as an auxiliary of their general expense budget or without the budget system, have found that it supplies a definite control feature which helps to pull down the overhead.

Special investigations should form a large part of the work of the cost department if it is to aid effectively in the solution of present-day competitive problems. Some of these investigations may lead nowhere, but if even one in ten should result in the uncovering of some practical economy measures the effort will probably be well spent. Some of these investigations are almost absurdly simple in their nature and reveal surprising situations.

A cost engineer of a large machinery building plant, walking through one of the extensive machining departments, had the idea that it would be of interest to count, as he passed through, the number of machines that were actually cutting metal and compare this with the total number supposed to be in operation at the time. He did so and found that out of a total of some 300 supposedly active machine tools, but 61 were actually cutting metal when he passed them. Some were waiting for work, others were having work set up on them or taken down, still others had been shut down because of the temporary absence of operators.

(Concluded on page 903)



Modern Equipment Saves Time

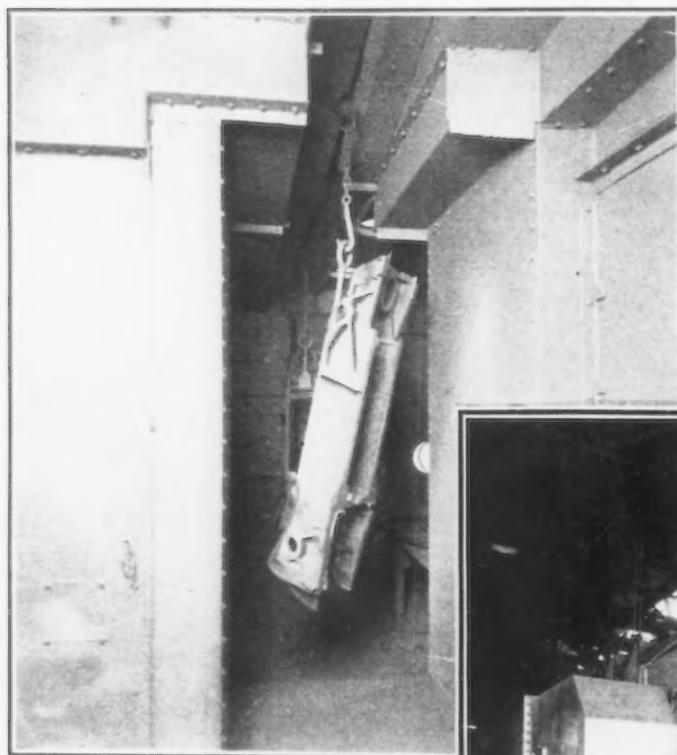
ALL materials are handled and all major operations are performed by modern labor and time-saving equipment in the new Charles City, Iowa, foundry of the Hart Parr Division of the Oliver Farm Equipment Co. The designers of this unit have taken a step forward in providing special ventilating equipment which, with modern production machinery, has made this foundry one in which working conditions are unusually favorable and cost of production is in keeping with up-to-date practice.

Large castings are made on two complete Beardsley & Piper sand-handling, sandslinger and mold-conveying units. Patterns are mounted on specially built, power-draw, molding machines, which are located on a rotating turntable. Molds are rammed by sandslinger units as the turntable rotates. The drag half is placed on a variable-speed power mold

conveyor, where cores are set and copes closed over them. As the molds are carried along they are poured from an overhead tram-rail crane that parallels the conveyor. Operators of these cranes conduct the entire pouring operation from their cabs. This is accomplished by use of an electric tilting ladle, controlled from the cab. The speed of the pouring crane can be synchronized with that of the mold conveyor.

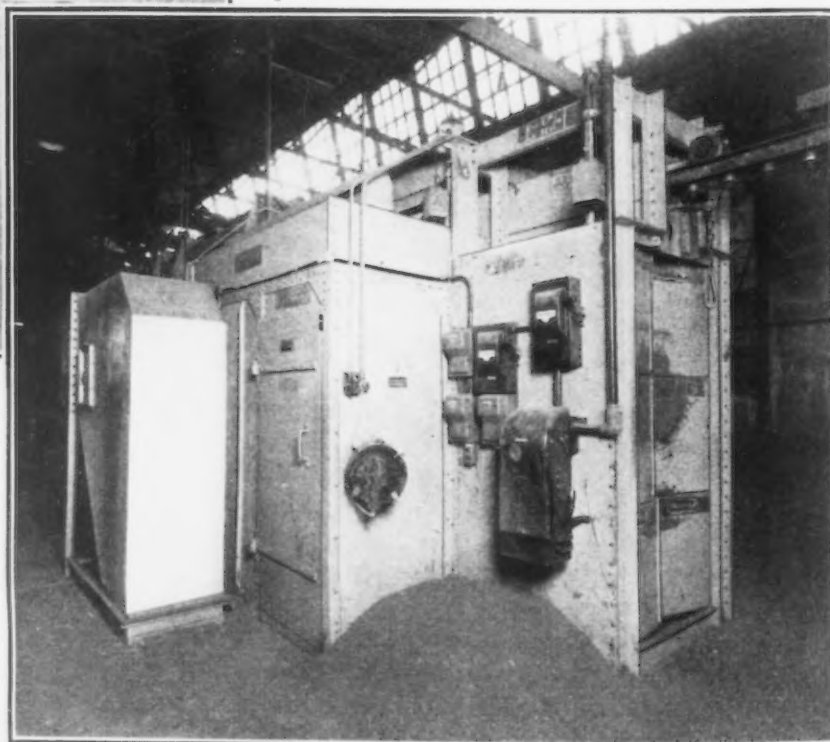
From the time molds are poured until the power mold conveyor delivers them to the shakeout station, they have received about 45 min. cooling time. At the shakeout, copes are taken off by a jib crane and shaken out, placed on a gravity conveyor and returned to the ramming unit. Castings are then lifted out of the drag half by an air motor hoist, mounted on a trolley and transferred to an overhead Palmer-Bee Co. power-cooling conveyor, which gives them an additional 45 min. to cool before delivery to the cleaning room.

Drags are then shaken out on a second shakeout table and transferred back to the power mold conveyor and returned to the turntable. When the castings reach the cleaning room, cores are knocked out in large stationary-type machines. Castings are then transferred to another overhead power conveyor, which carries them to a twin sand-blast room, where they are cleaned while hanging on the conveyor as it passes through the rooms. By means of



Conveyors (right) carry castings through a continuous twin-room sand-blast

A casting being conveyed (above) from the first into the second sand-blast room



e and Labor in New Foundry . . .

air motor hoists, mounted on an overhead rail, castings are taken from the sand-blast conveyor, placed on a gravity conveyor and delivered to the chipping station. With this operation completed, castings are loaded on cars for delivery to the storeroom and machine shops.

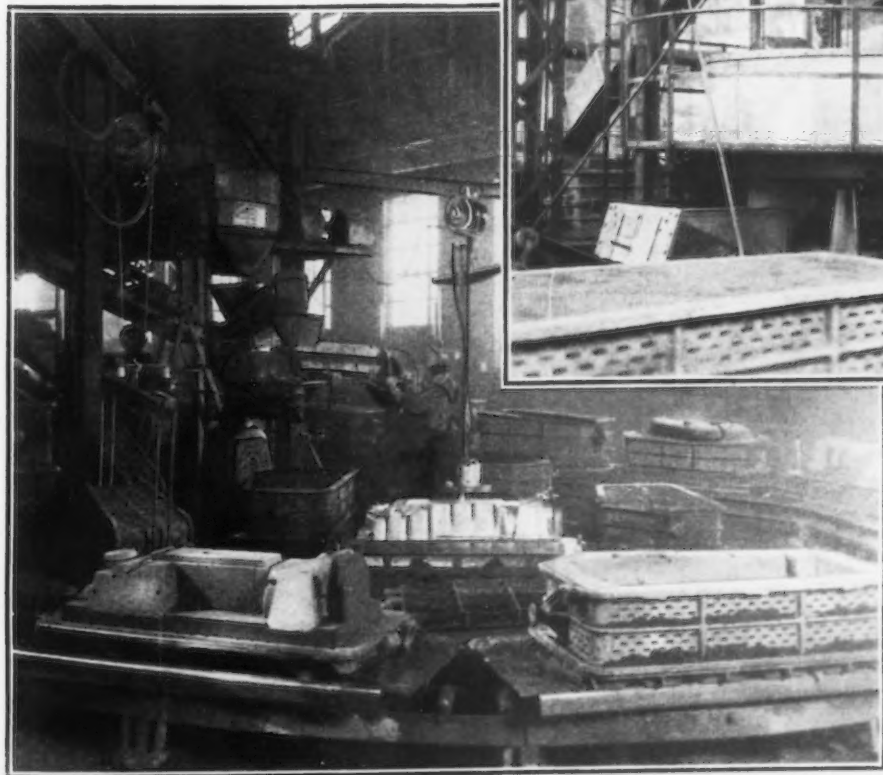
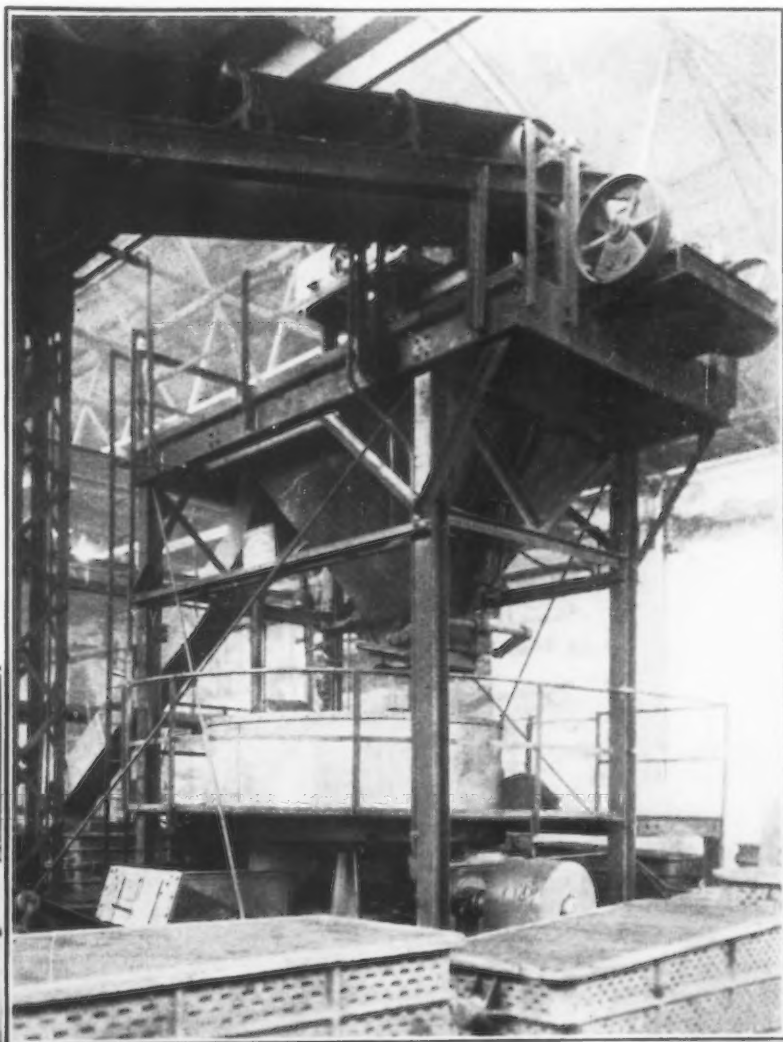
Spillage and strike-off sand from the molding machines on the turntables falls through a grating to an apron conveyor. This conveyor also receives sand from the cope and drag shakeout and elevates it all on an inclined belt to the opposite end of the unit. It is then discharged on a vibrating screen.

WORKING conditions made unusually favorable by providing special ventilating equipment to remove dust and gases.

Modern labor and time-saving equipment handles all materials and performs all major operations. Cost of production lowered.

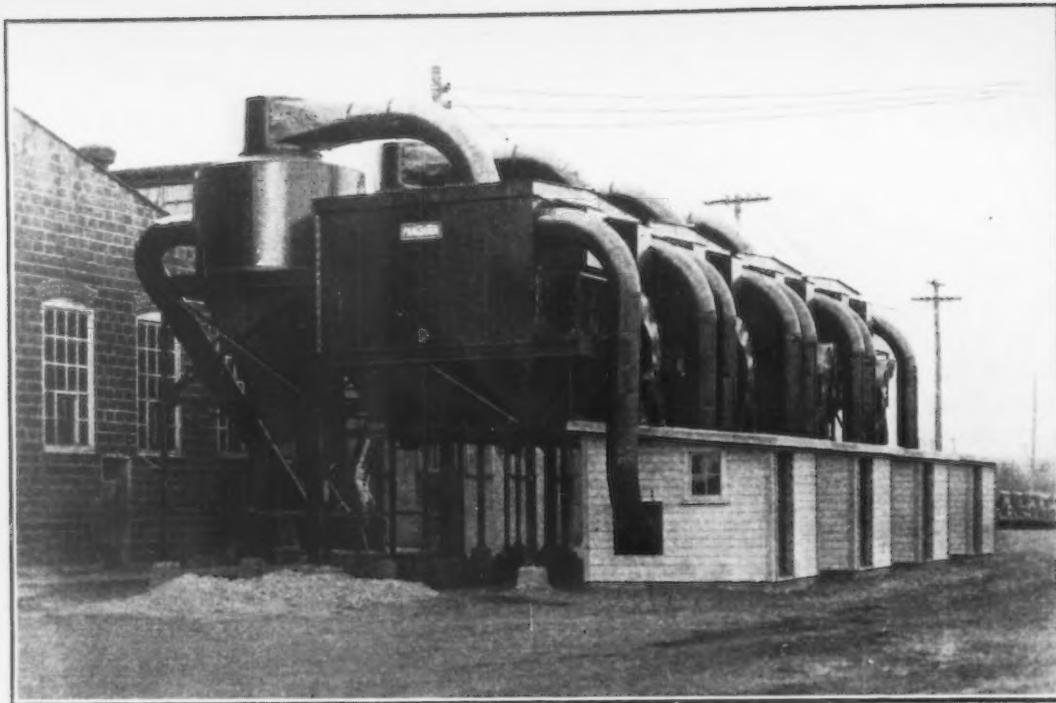
Continuous molding units have extreme flexibility in operation and insure thorough preparation of the sand.

A feature is a twin-room sand-blast into which castings are carried suspended from conveyors.



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Sandslinger and conveyor equipment (left) contribute to low cost of production

A belt conveyor delivers sand to overhead screen through which it drops into bin which feeds to mixer
▼ ▼ ▼



through which it passes into a storage tank directly over a No. 3 Simpson sand mixer. All sand passes through the mixer, where proper additions of water, facing, etc., are added. The mixer discharges to another inclined belt which returns the sand to the turntable end of the unit, discharging it on an aerator and into the main storage tank.

Features of these modern continuous molding units at the Hart Parr Division of the Oliver Farm Equipment Co. are extreme flexibility of operation and thoroughness of sand preparation. For example, these units employ two shakeouts, one each for the copes and drags. Two shakeouts mean less congestion at each station. Either the cope or the drag shakeout has capacity to handle the entire production of the system in case one or the other should break down or need repairs. Both shakeouts are thoroughly ventilated, thus removing objectionable gases and dust that otherwise would accumulate at this point. Two shakeouts reduce the necessity of shutting down the entire unit, should one or the other fail to function.

The successful continuous sand-handling system is the one that properly prepares and controls its sand. At the Hart Parr Division plant the sand-control laboratory performs an important service in regulating the moisture, permeability and bond strength of the sand. From the results of analyses taken at intervals during the day there are determined the necessary amounts of facing, clay or reclaimed sand required to keep the unit sand in the desired condition. No new sand is added to the slinger units. Fines, etc., are taken out by means of a pneumatic system, thereby controlling permeability.

In a preceding paragraph mention was made of how the castings are delivered on an overhead power cooling conveyor to the core knockout station in the cleaning room. Here the castings are transferred to a knockout machine. Sand falls through a grating to an apron conveyor, which in turn discharges on

a belt where the rods and tramp metal are removed by means of a magnetic separator. Sand is then delivered into a large crusher for the purpose of breaking up all lumps, and it is finally elevated into gondola cars for transport to the core room or the sand-handling units. By use of an extensive pneumatic system, furnished by the Pangborn Corporation, Hagerstown, Md., all fines are removed at various

locations on the knockout system. This sand-reclaiming equipment makes it possible to save and reuse all sand, whereas by old methods this core sand would be used but once.

Each core room has its own independent sand-handling, preparing and distributing system. In the small core room sand is prepared in mixers which discharge into a bucket suspended from a tram-rail electric hoisting and traveling crane. This crane is equipped with double suspended hoists to raise and lower the bucket at the mill and at the hoppers above the core makers' benches. Sand is delivered by this crane to hoppers over each of 72 core benches.

As the core maker completes the filling of his plates, he places them on a rack suspended from an overhead conveyor, which carries the cores through a three-pass, oil-fired, Young Brothers continuous conveyor-type core oven. Cores are then delivered to an unloading station, where they are removed from the racks, sprayed, jigged, set up and conveyed to the molding units.

Core Oven Mounted Overhead, Allowing Storage Space Underneath

The core oven is 170 ft. long by 15 ft. wide, and is of the insulated panel-type construction. It is mounted overhead, allowing about 8 ft. underneath, which space is utilized for core making, core storage and space for wires and supplies. It is interesting to note that in this core department 72 core makers may be employed, plus helpers, jig, set-up and spraying crews, with oven, oven conveyor, core benches and hoppers and core storage all in a room 200 ft. long by 32 ft. wide.

In core room No. 2 all large cores are made on jolt rolover machines and baked in car-type ovens. After baking, they are taken from the cars, sprayed, jigged and delivered by gravity conveyors to the continuous molding units. Sand is prepared on the

second floor in two mixers and distributed by screw conveyors to hoppers over machines which are serviced by jib cranes and overhead traveling cranes as well.

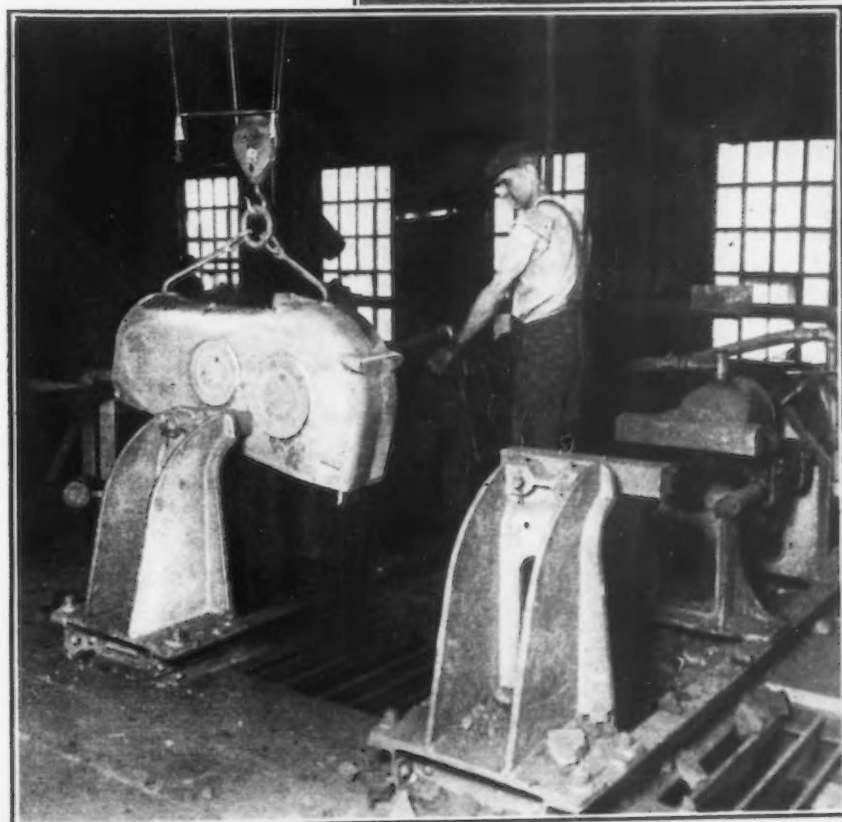
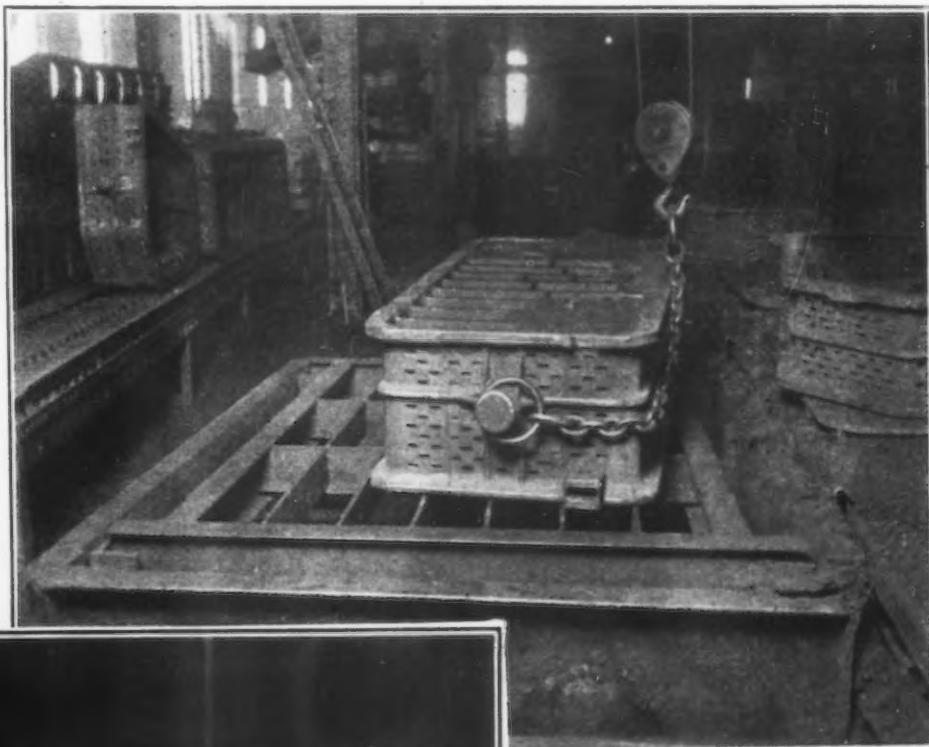
On the charging floor, iron is handled with large electromagnets into buckets, which are weighed and charged directly into two No. 10 Whiting cupolas. Four men now do the work on the charging floor that previously required ten or more.

All of the iron from the cupola is run into receiving ladles where additional mixing takes place. As slag comes from the cupola it is run into slag ladles suspended from a carrier mounted on a tram-rail track, which conveys the pots out of the foundry building and discharges their contents into trucks which take the slag to a dump.

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Ventilators at shake-out stations (right) remove dust and improve working conditions.

An example of the effectiveness (below) of adequate ventilation at core knockout station.

Arresters for the ventilating system (opposite page) at mold shakeout stations are mounted on steel framework in the foundry yard.
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Low-Temperature Coking Process

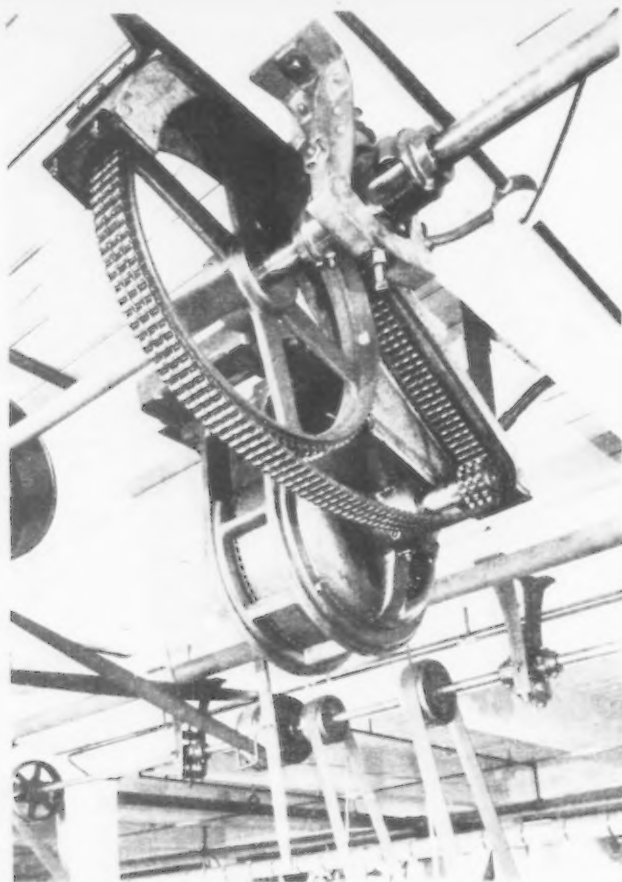
A METHOD of making coke by a low-temperature process, in which the physical operation resembles that of making iron in a blast furnace, has been developed by the Meier Coke Retort Co., 1315 West Lockwood Avenue, Kirkwood, Mo. The coal is carried from a bin through a conveyor in which it is preheated by waste gases. It passes then into a revolving retort, which is either insulated or water jacketed, according to local requirements.

Coke coming out of the bottom of the revolving retort is carried by another conveyor to the bin. This conveyor accomplishes the quenching, the hot gases being carried off to hot stoves operated in conjunction with the equipment. Fuel for coking is gas, which has been passed through the hot stoves and enters the

retort at from 1000 to 1700 deg. F.

In conjunction with the exhaust gases is a by-product recovery plant, to obtain the oils and tars and other ingredients of the gases coming off from the top.

Advantages claimed for this process are a maximum yield of high-grade gases, oils and tars, especially the light oils, and absence of cracking of these gases, oils and tars in the retort, a flexibility in operating rate and generally simple operating conditions. The plant is said to be low in installation cost as well as in operative cost, and uniformity is claimed in both heating and product. Methane is cracked in the hot stoves and a considerable amount of carbon black thereby recovered.



*Triple Roller Chain Drive
Transmitting Power from
Electric Motor to a Group
Drive Shaft Running at Much
Lower Speed*

Roller Chains in Industrial Applications

By J. F. McCANN

*Chief Engineer, Duckworth Division,
Baldwin-Duckworth Chain Corporation*

TWO methods, one using gears and the other chains, are available for the transmission of power where a positive velocity ratio must be maintained between the connected shafts. Chains are used (1) where the distance between the shafts is too great for gears and (2) where it is not possible to maintain accurately (to the degree required for gearing) the center distance between shafts and the parallelism of the shafts.

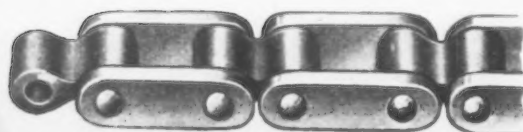
Obviously, the field for chain drives is practically unlimited and there is no industry in which such drives cannot be profitably employed, with an accompanying marked increase in power-transmission efficiency. The chain drive with its inherent advantages has fulfilled a pressing industrial need, not only through its positive action but also by means of its unity and flexibility. With it, for example, motors may be mounted conveniently and located in their most advantageous position, an arrangement that delivers power through a neat compact unit, directly to a machine, irrespective of the position of other units, line shafting or belting.

Power-transmission chains may be broadly classified as block, inverted-tooth, and roller chains.

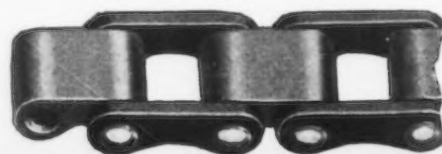
Block chains consist of an assembly of solid-steel, figure-8-shaped, or B-shaped steel blocks drilled at both ends to receive rivets by which they are attached to side links. Such chains are suitable only for light work, where the speeds are less than 800 ft. a minute, owing to the fact that in a comparatively short time the chain stretches, due to wear. This increases the pitch of the links. The mating sprocket wheel, on the other hand, wears with very little change of pitch. As a result of the variation in pitch, the blocks ride higher and higher on the backs of the teeth as they round the sprocket, the load is carried by a single tooth, the wear becomes excessive and noise develops.

Objectionable features of the older block chain led to the development of the inverted-tooth chain, a very successful design which has enjoyed some twenty-odd years of popularity. Theoretically, with this type of chain, as stretching takes place, the links take positions farther and farther away from the center of the sprocket, this action resulting in an increase in the lengths of the sides of the pitch polygon corresponding to the elongation of the links.

Each link then remains in constant contact with its own tooth from the time of engagement to that of



*B-Block and 8-
Block Chains,
Showing How
They Are
Made*



release, and consequently the links seat themselves without sliding action. Nearly noiseless operation results. For this reason, they came to be known as silent chains. In practice, however, the wearing action that takes place on the pin bearing surfaces in the chain links causes the pins to fit loosely. Elongation follows until it becomes eventually so serious as to cause noisy operation and even jumping of the sprocket teeth.

This condition is alleviated in different ways. The Baldwin-Duckworth Chain Corporation, Springfield, Mass., accomplishes it by making the pins hollow and with a slight split. Thus they act as a spring cushion, in that they close together slightly when the load is applied and release when at the slack side of the chain.

Roller chains as made by the Duckworth company consist of an assembly of roller links, each of which consists of two hollow steel shafts, called bushings, on which rollers revolve, fitted into large holes in the side links, the roller links being joined by means of side plates and rivets. The correct tooth form gives a maximum efficiency throughout the entire life of both sprockets and chain. It is that adopted by the American Society of Mechanical Engineers, the Society of Automotive Engineers, and the American Gear Manufacturers Association.

Roller chains are not new. They existed, in fact, in the early days of the block chain, and were subsequently discarded for high-speed work in favor of the inverted-tooth chain, because they appeared to be subject to the limitations of the block chain. They had become known as a slow-speed chain. During the past few years, however, several manufacturers in this country, after intensive research work both in the laboratory and actual field practice, have established the fact that roller chains, properly made and applied, can be run at the same relative high speeds as any other type of chain, and that they will then be as silent in operation as any chain.

The advances in roller-

THREE different types of chains are available for transmitting power at positive velocity ratios. The author shows the advantages of the roller type of chain. Maintenance of accurate meshing with sprockets is one strong feature. There has been considerable improvement in manufacturing methods in recent years, and the makers are working to closer tolerances than ever before. Hence, the product is giving better service and is finding a wide use in many industries.

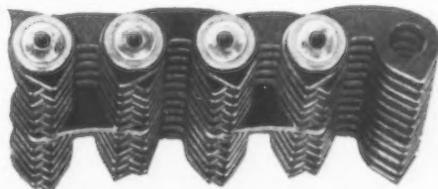
chain construction are not marked by any fundamental changes. They consist rather of improved methods of production, of the use of correct materials, of proper heat treatments, and of working to close tolerances. Thus, the roller chain properly made is a quiet-running chain. For this reason, the name "silent chain" for the inverted-tooth chain was an unhappy selection, as the name might equally well be applied to quiet-running roller chains.

Multiple roller chains, constructed of two or more strands, broaden the extent of the single roller-chain drive. They operate at the same rotative speed as single chains of equal pitch, with a substantial increase of power-transmission capacity, proportionate to the number of strands employed. Actual bearing surfaces of pin and bushing are increased, also, giving greater ultimate wearing area and longer life. They also render smoother and quieter operation, due to the finer pitch that may be employed on a drive of this nature rather than the larger and bulkier pitch which would be necessary in a single chain to carry the same load.

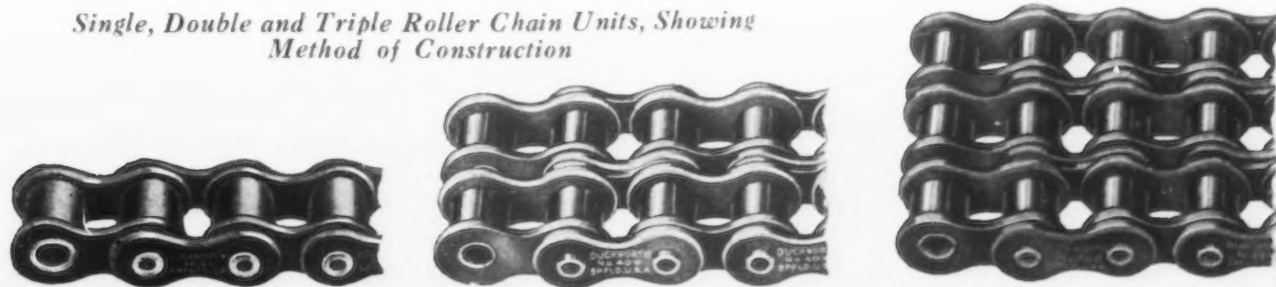
It has been definitely established that a small-pitch, multiple, roller chain will satisfactorily carry an 8-hp. load at 3500 ft. a minute, which is considered about the maximum speed at which any type of chain can be run with good results. It has also been ascertained that a 200-hp. drive can be successfully operated at 300 ft. a minute with the use of multiple roller chains.

Roller chains have been used on many installations as a shock-absorbing element because they have a tendency, through the flexibility of various members, to "take the grief," thereby saving expensive machinery from incurring heavy loss. In this connection sprockets may be used with a safety or shearing pin which has a lesser ultimate tensile strength than the chain, and consequently will shear before the chain or the driven machine will break.

Bicycles, motorcycles, trucks, tractors, etc., can and do use them to advantage. During the last few years several



Inverted Tooth Chain Designed to Overcome the Troubles Due to Wear in Block Chain



Single, Double and Triple Roller Chain Units, Showing Method of Construction

prominent manufacturers of automobile motors have adopted the multiple roller chain for operating the motor crank and camshafts in proper ratio with each other. Indications are that more automotive front ends will be equipped with this type of chain in the near future.

For general industrial purposes they will fulfill almost any normal power-transmission requirement. They may be run at from a fraction of one revolution a minute, as in a conveyor drive, up to relatively high speeds, as in electric motor drives of 1750 r.p.m. and above.

Several roller-chain manufacturers have not found it unusual to specify installations running well above 2000 ft. a minute. The ruggedness and substantial construction of the roller chain renders it especially suitable where there is moisture, as in engine room steam, grit or coal dust. Under the worst operating conditions, their efficiency is said to be rarely less than 97 per cent. In places where there is danger of igniting inflammable material by the phenomenon of electrical statics, they may be used without fear or worry of fire.

Prospective users of roller chains might well remember that the finer the pitch of chains used the less the degree of sound emanating from the chain drive. This is due to the fact that finer pitch chains exert a shorter lever action, when entering the sprocket teeth, than the larger pitch chains; hence, the less the impact and resultant noise. In this connection a finer pitch chain in multiple widths may be used to advantage. Each strand will carry the load in exact proportion with the other.

In ordinary practice it is not well to have the ratio of driver and driven sprockets more than six to one, although in some instances ratios as high as nine to one have been used. It is also well to remember that driving pinions of less than 17 teeth are not to be recommended. On certain special purpose installations, this rule may be aban-

doned; but it is a good idea to have the opinion of the engineering staffs of the chain companies before proceeding with a design departing from standard practice.

Center distances for any chain drive must exceed half the diameter of the large sprocket, plus half the diameter of the small sprocket, to keep the sprocket teeth from touching each other. It is desirable that the center distance should not be less than 30 times the pitch of chain used on the drive. A good way of establishing the center distance is to make it equal to $1\frac{1}{2}$ times the diameter of the large sprocket plus one-half the diameter of the small sprocket.

Whenever possible, chain drives should be off the vertical plane. However, many installations are working strictly in a vertical plane and are experiencing long life and giving satisfaction. Very little slack should be used on vertical centers. When necessary, idler adjusting sprockets may be used on the side of the chain reverse to the side that contacts with the driving and driven sprockets. Idlers should not run at rotative speeds faster than the maximum speeds of other sprockets. It is good practice to avoid the use of idlers unless they are an absolute necessity.

Chains should never run with both strands tight. The loose strand must have a certain amount of slackness, varying with the center distance. Sprocket alignment also plays an important role in the success of a

chain drive, it being a good plan, at the time of installation, to line up the sprocket faces with a straight edge.

Chain guards can be used to advantage for the purpose of preventing any one from incurring injury by accidental contact with the chains and sprockets. Guards made oil tight may be equipped with a small reservoir of oil into which the chain dips when operating, thus insuring constant lubrication. While constant lubrication is not always necessary, it adds considerably to the ultimate life of the drive. Drip-feed lubricators are to be recommended.

SELECTION TABLE

For Standard Roller Chain

Type	Pitch	Wth.	Dia.	Roller		Horsepower (Upper) Load, Pounds (Lower)									
				Chain Velocity (Feet per Minute) =		Pitch Diam. \times R.P.M.									
						50	100	200	300	400	500	800	1000	1200	1500
Single	$\frac{3}{8}$	$\frac{3}{8}$	0.200	197	183	161	143	129	108	93	81	72	62	51	42
	$\frac{1}{2}$	$\frac{1}{2}$	0.306	164	152	132	119	107	89	77	67	60	51	42	35
	$\frac{5}{8}$	$\frac{5}{8}$	0.306	240	224	196	174	157	132	113	99	88	75	62	51
	$\frac{1}{2}$	$\frac{3}{4}$	0.312	328	305	267	238	215	179	154	135	120	103	88	75
	$\frac{3}{4}$	$\frac{3}{4}$	0.400	521	484	425	379	342	285	245	215	191	164	140	119
	$\frac{1}{2}$	$1\frac{1}{2}$	0.470	113	211	370	436	596	746	854	935	100	110	120	130
	$1\frac{1}{2}$	$1\frac{1}{2}$	0.625	1332	1240	1088	967	873	728	626	548	487	417	350	280
	$1\frac{1}{2}$	$2\frac{1}{2}$	0.750	1940	1800	1580	1410	1270	1060	912	798	711	609	520	430
	$\frac{3}{8}$	$\frac{3}{8}$	0.200	394	366	322	286	258	216	186	162	144	122	103	86
	$\frac{1}{2}$	$\frac{1}{2}$	0.306	480	448	392	348	314	264	226	198	176	150	126	106
	$\frac{1}{2}$	$\frac{3}{4}$	0.312	656	610	534	476	430	358	308	270	240	206	176	146
	$\frac{3}{4}$	$\frac{3}{4}$	0.400	1042	968	850	758	684	570	490	430	382	328	278	228
Double	$\frac{3}{8}$	$\frac{3}{8}$	0.200	1500	1396	1224	1090	984	820	704	618	552	472	392	320
	$\frac{1}{2}$	$\frac{1}{2}$	0.306	1880	1744	1520	1360	1240	1040	904	792	704	616	512	424
	$\frac{1}{2}$	$\frac{3}{4}$	0.312	2264	2096	1840	1664	1520	1280	1120	984	872	768	656	544
	$\frac{3}{4}$	$\frac{3}{4}$	0.400	3520	3264	2880	2576	2360	2000	1760	1552	1376	1200	1024	848
	$1\frac{1}{2}$	$1\frac{1}{2}$	0.625	5880	5440	4760	4240	3840	3200	2800	2448	2144	1872	1600	1328
	$1\frac{1}{2}$	$2\frac{1}{2}$	0.750	8520	7840	6800	6080	5520	4640	4080	3584	3136	2736	2336	1936
	$\frac{3}{8}$	$\frac{3}{8}$	0.200	591	549	483	429	387	324	279	243	216	186	156	126
	$\frac{1}{2}$	$\frac{1}{2}$	0.306	720	672	588	522	471	396	339	297	264	225	192	158
	$\frac{1}{2}$	$\frac{3}{4}$	0.312	984	915	801	714	645	528	462	405	360	309	258	208
	$\frac{3}{4}$	$\frac{3}{4}$	0.400	1563	1452	1275	1139	1026	855	735	645	573	492	408	336
	$\frac{1}{2}$	$1\frac{1}{2}$	0.470	2250	2094	1836	1635	1476	1230	1056	927	828	708	592	492
	$1\frac{1}{2}$	$1\frac{1}{2}$	0.625	3996	3720	3264	2901	2619	2184	1878	1644	1461	1251	1056	864
	$1\frac{1}{2}$	$2\frac{1}{2}$	0.750	5820	5400	4740	4230	3810	3180	2736	2394	2133	1827	1533	1263

The above loads and speed ratings are maximum. Where loads are unsteady, chain subjected to sudden jerks or not well lubricated, lower values than calculated should be used for both speed and load factors in selecting the correct chain.

ed also, as a simple means of lubrication.

In the case of pulsating loads, such as are encountered in pumps of single action, compressors, etc., a large factor of safety should be used. Rarely does a properly-specified chain break. High-grade roller chains are made of the best materials and are usually heat-treated to withstand abnormal shocks and strains. However, the life of a chain is no greater than its actual pin-bearing area. Consequently, a greater factor of wear should be considered on any abnormal chain drive.

Knowing the load, in pounds, to be transmitted and the pitch diameter and angular velocity of the driver, the velocity of the chain and its horsepower are readily calculated. The velocity of the chain equals

$$\frac{\text{pitch diameter}}{4} \times \text{r.p.m.} \quad \text{The horsepower equals}$$

$$\frac{\text{load in pounds} \times \text{velocity in ft. a minute.}}{33,000} \quad \text{If the torque}$$

is known, the horsepower may be determined by the formula

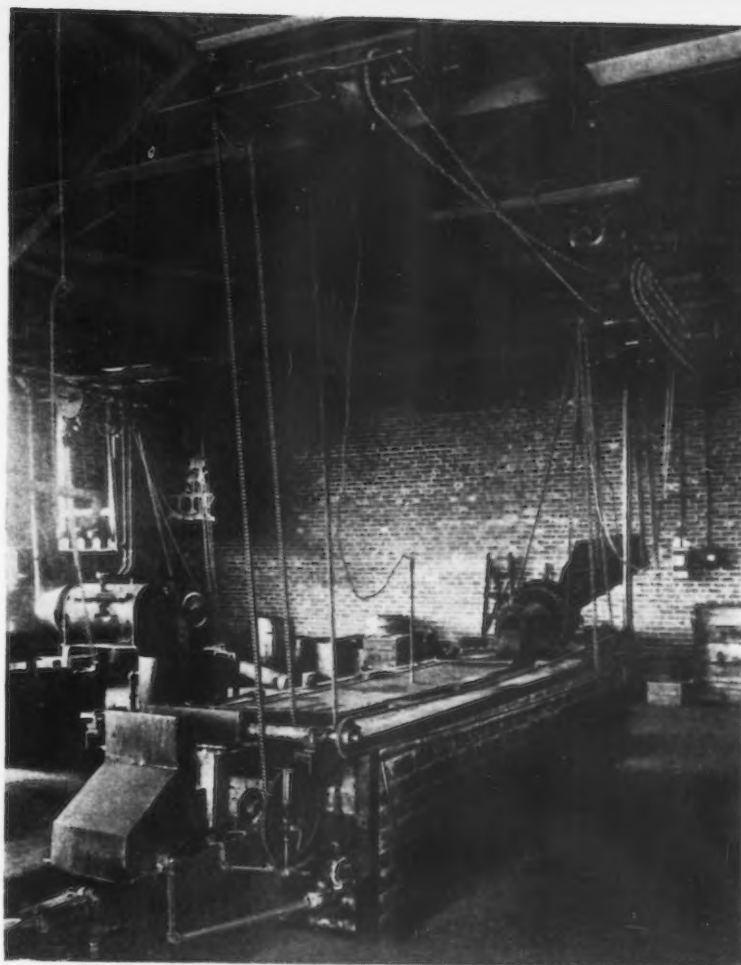
$$\frac{\text{torque (in pounds)} \times \text{r.p.m.}}{63,025} \quad \text{the torque being equal to}$$

the load (in pounds) multiplied by its perpendicular distance (in inches) from the center-line of the shaft. The rated horsepower and loads corresponding to various chain velocities are given in an accompanying table, for single, double and triple roller chains.

New Device Supplies Hydrogen for Welding

General Electric Co. has developed equipment to dissociate anhydrous ammonia into its component parts, 25 per cent nitrogen and 75 per cent hydrogen, to such degree as to be suitable for use with atomic hydrogen welding equipment. By the use of this equipment the hydrogen can be obtained very economically, it is stated.

The dissociator has capacity to supply enough



Roller Chain Power Transmission Drive in a Modern Heat-Treating Plant, Showing Both Vertical and Horizontal Drives and Also Reverse and Quarter-Turn Drives.

dissociated gas, at atmospheric pressure and temperature, to operate a $\frac{1}{8}$ -in. electrode holder for currents up to 70 amp. The gas pressure at delivery does not exceed 10 lb. per sq. in. The electrical rating is 3.5 kw. at 220 volts and 60 cycles.

Ammonia gas is drawn directly from a standard tank of good quality anhydrous ammonia. The tank is arranged to discharge gas, and not liquid ammonia, into the piping. The ammonia tank, if kept at room temperatures, will supply gas at pressures from 100 to 150 lb. per sq. in. until the tank is emptied and ready to be replaced.

An electrical-ly and thermally insulated alloy tube filled with an ammonia-cracking catalyst, and connected to a low-voltage, high-current transformer, forms the dissociator.

Device Is Equipped With Control and Indicating Instruments

Suitable inlet and outlet tubes and openings for temperature-indicating and controlling devices are provided. All parts subjected to high temperatures are made of heat-resisting alloys and are welded at all heated joints.

Threaded fittings are provided for replacing the catalyst and the thermocouple. Such screwed joints are placed in unheated parts of the dissociator and will not leak at specified pressures in the dissociator. The equipment is provided also with suitable temperature-control and indicating devices, regulator, safety devices, heat interchanger, etc.

Gas for Welding Ready in Short Time

In operation, a small snap switch is pressed. After about 10 min. the temperature indicator will show a reading within the operating zone. The ammonia tank valve may then be opened and the operator is ready to weld. As soon as the arc is struck the gas will flow and when the arc is broken the gas will stop. When everything is functioning properly the dissociator will need no more attention, even though the operator ceases welding for some time.

Artificial Atmospheres for Electric Furnaces

By A. N. OTIS
General Electric Co.

PLANTS of the kind described briefly in the first half of this article, with the accessories, require a considerable capital investment. They would not be justified unless large quantities of gas are required. However, in large manufacturing plants where the gas can be distributed through a piping system to the points of utilization, they undoubtedly are economical, especially if pure gases are required. Small users purchase these gases in pressure tanks at considerable cost and some inconvenience.

Ammonia gas (NH_3) may be dissociated by heat into a gas composed of 75 per cent hydrogen and 25 per cent nitrogen. It is necessary only to pass the gas through a heating apparatus which raises the temperature to about 1550 deg. Fahr. This is an exceedingly simple apparatus and the gas produced is entirely suitable for brazing and annealing operations and for atomic hydrogen welding.

Anhydrous ammonia is obtained in pressure tanks in liquid form. A tank 7 ft. long by 10 in. diameter, containing 100 lb. of ammonia, produces 4000 cu. ft. of dissociated gas. The heat required is about 25 kw-hr. for each 1000 cu. ft. of gas produced. The heat cost, therefore, is very small.

Quantity of Gas Required

To give some idea of the quantity of gas used by a furnace, it may be said that 400 cu. ft. an hour would supply a fairly large furnace. The large continuous brazing furnace (Fig. 2, last week) requires about 500 cu. ft. of mixed gas, hydrogen and nitrogen an hour. These are very large

furnaces, about 60 ft. long, and the doors are opened frequently to charge and discharge the work. An atomic hydrogen welding torch will require about 50 cu. ft. of gas an hour. A dissociator of 50 cu. ft. an hour capacity, shown in Fig. 5, can be held in the hand.

Apparatus for producing electrolyne is similar in principle, and the operation of the equipment will be described by its application to city gas. Table II shows the analysis of a typical city gas, and it will be noted that it is composed largely of hydrogen and methane.

The purpose is to dissociate the methane into hydrogen and carbon, after which the carbon will combine with any oxygen present to form carbon monoxide, CO. If insufficient oxygen is present, the remaining carbon will deposit as soot in the chamber. But if steam is added it also dissociates, liberating its hydrogen and also its oxygen in the



Fig. 5—Apparatus for Dissociating Ammonia into Hydrogen and Nitrogen. Capacity is about 50 cu. ft. an hour

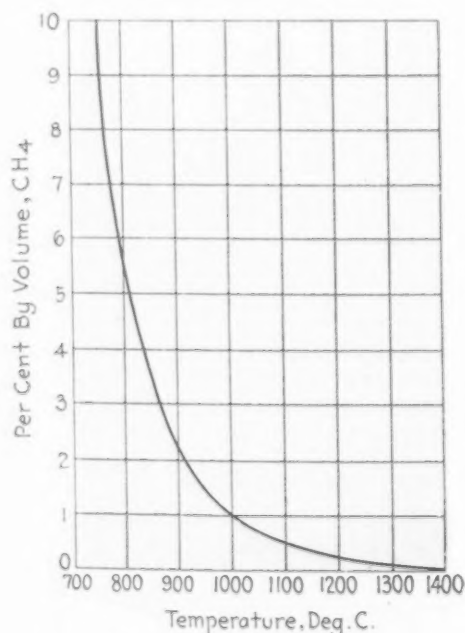


Fig. 6—Equilibrium Relation of Hydrogen-Carbon-Methane with Temperature in Dissociation of a Hydrocarbon Gas

PREVENTING oxidation through use of an atmosphere rich in hydrogen, and preventing decarburization by a small methane content, are two functions of a controlled atmosphere in a furnace. Both results may be achieved through the use of the apparatus described in this article and that of last week. For many purposes such an atmosphere results in better steel and in diminished losses from scale.



Fig. 7.—Apparatus for Producing Electrolene, Capacity 1200 Cu. Ft. an Hour, from City Gas

presence of the carbon. The carbon and oxygen combine to form more CO, which increases the volume of CO produced. The hydrogen liberated also adds to the volume, so that the total volume of gas produced is about double the volume of city gas used. The process, therefore, breaks down the hydrocarbons, and builds up a new gas of different composition.

Both of these gases are composed largely of hydrogen and carbon monoxide, as may be noted, and are, therefore, strongly reducing.

Complete dissociation of the methane does not take place at 1000 deg. C. because of the equilibrium relation in the system carbon-hydrogen-methane, as shown in the curve, Fig. 6. The methane in equilibrium at this temperature is about 1 per cent, and can be varied by varying the temperature, as indicated.

Methane is dissociated in accordance with the reversible reaction.



Addition of heat is required to produce the reaction in one direction, and heat is given up if it takes place in the other direction. The heat required for dissociating 1000 cu. ft. of city gas, mixed with

steam, is about 80 kwhr. It should be remembered that 2000 cu. ft. of electrolene is thus produced. With natural gas about four volumes are produced.

Fig. 7 shows an apparatus of this type, entirely automatic in its operation. It has a capacity for producing 1200 cu. ft. of dissociated gas an hour from city gas.

This apparatus can be made in small sizes, with a self-contained automatic steam generator. Thus there has become available a small, compact and inexpensive equipment for producing satisfactory gases for artificial furnace atmospheres, from readily available materials and at a low cost. Gases of high purity are not necessarily required for this

TABLE II.—COMPOSITION OF A TYPICAL CITY GAS
(Coke oven gas)

Carbon monoxide.....	CO	7.4 per cent
Carbon dioxide.....	CO ₂	1.9 per cent
Hydrogen	H ₂	55.5 per cent
Methane	CH ₄	28.2 per cent
Illuminants		2.8 per cent
Nitrogen	N ₂	3.4 per cent
Oxygen	O ₂	0.8 per cent
		100.0 per cent

particular purpose.

Reliable instruments are available to indicate the hydrogen content of a gas and record it on a chart. These are similar to temperature-recording instruments. Their operation is based on the thermal conductivity of gases. As hydrogen has a thermal conductivity 6 to 7 times higher than the other usual gases, the indications of hydrogen content are very accurate.

It is interesting to compare the cost of hydrogen produced by the various methods outlined.

Actual costs, of course, will vary with local conditions, but Table IV will give an approximation of the relative costs. The transportation cost of containers is not included in this comparison. A suitable treatment can be readily worked out for gases of various compositions, as the basic principles apply to all.

Fig. 8 shows a small annealing furnace of the elevator type served by an electrolene producer.

The development of suitable apparatus for supplying protective atmospheres will remove the chief obstacle to a wider use of furnaces requiring them. We may, therefore, confidently expect that the value of such furnaces will be recognized and that they will become of considerable importance in

TABLE III.—COMPOSITION OF ELECTROLENE
(Using the coke oven gas previously referred to)

Original Composition, Per Cent		Dissociated Without Steam at 1000 Deg. C.	Dissociated with Steam at 1000 Deg. C.
Carbon monoxide	CO 7.1	10.00	20.00
Carbon dioxide	CO ₂ 1.9	0.00	0.00
Hydrogen	H ₂ 55.5	85.00	75.00
Methane	CH ₄ 28.2	1.00	1.00
Illuminants	2.8	0.00	0.00
Nitrogen	N ₂ 3.4	4.00	4.00
Oxygen	O ₂ 0.8	0.00	0.00

manufacturing operations of the future.

Applications to Industry

In the steel industry, these furnaces offer the possibility of annealing sheets, bars, wire and similar products

without the use of pots, and without scale or decarburization. It may also be possible to anneal stacked sheets, such as are used for tin plate, for example, with considerable reduction of time and floor space, and possibly with considerable savings in over-all cost.

Those who are familiar with the methods employed for annealing sheets will appreciate the advantage to be gained by the elimination of pots and the production of clean sheets. Fig. 9 shows in outline a hood-type furnace for annealing sheets in an atmosphere of electrolene.

Effect of Gases on Carburization

For steels having a considerable carbon content, there is an attendant reaction between the hydrogen and the carbon in the steel, tending to decarburize the steel and to form methane in the atmosphere, similar to the reaction between hydrogen and iron oxide to form water vapor, as previously discussed.

Campbell, Sykes and others have investigated the

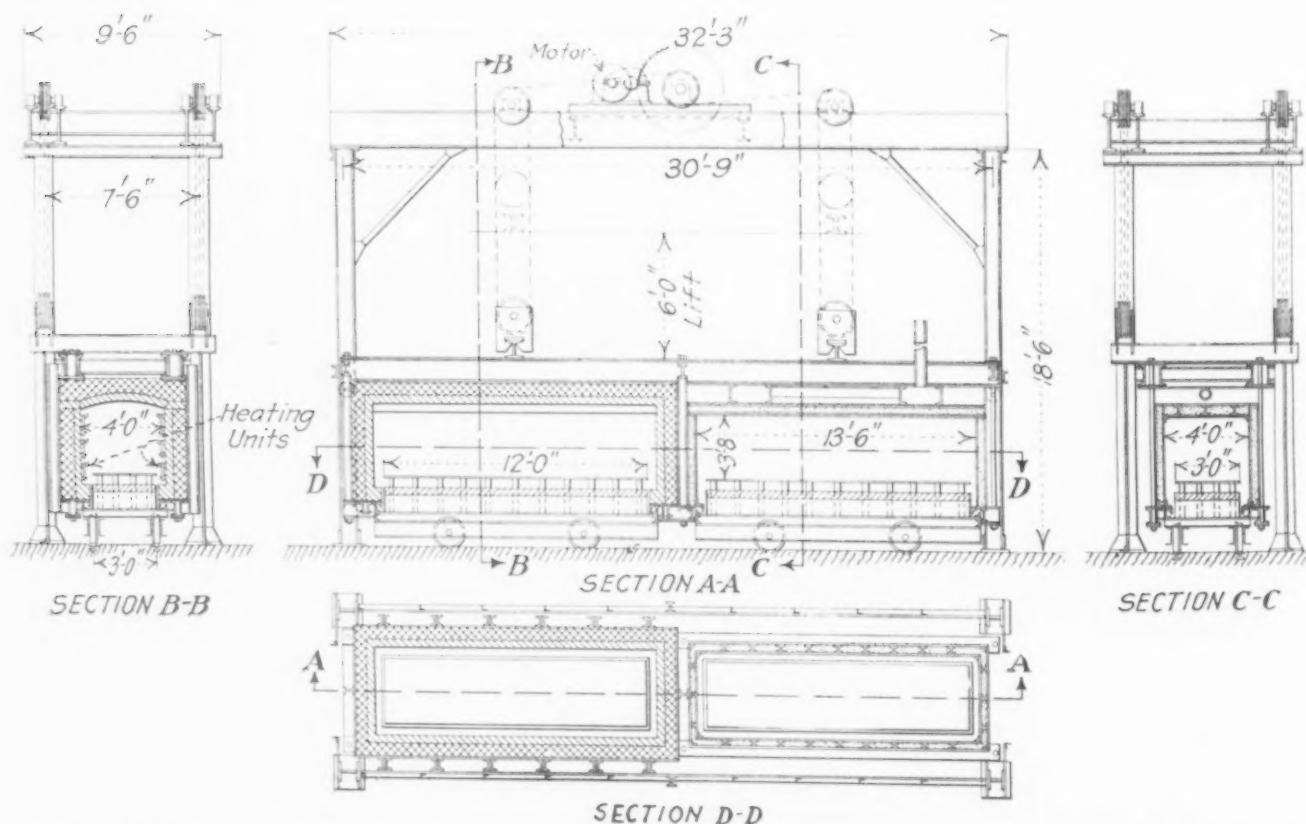


Fig. 9—Outline of Hood-Type Furnace with Cooling Hood for Annealing Sheets in Atmosphere of Electrolene

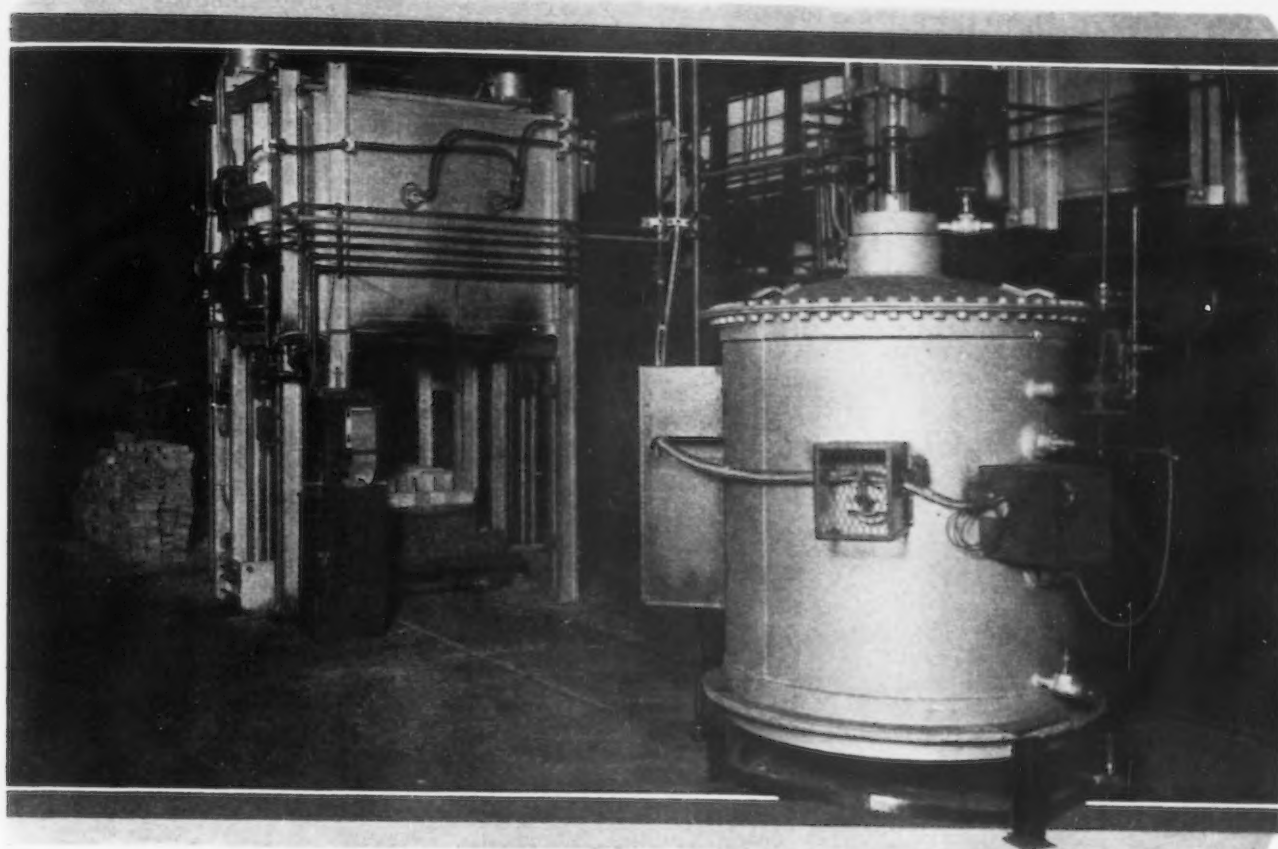


Fig. 8—Small Annealing Furnace of the Elevator Type, Equipped with Electrolene Producer (in foreground)

effect of various mixtures of hydrogen and methane on the carburization of steels. (See "Carburizing Iron with Mixtures of Hydrogen and Methane," by Sykes, American Society for Steel Treating, Vol. 12, page 737.)

The curves in Fig. 10, from data by Sykes, show the percentages of methane for hydrogen-methane mixtures necessary for neutrality to carbon in solution in iron for steels of three different carbon contents. It will be noted that the methane content required for neutral conditions is quite small.

For example, with a fairly high-carbon steel, 0.59 per cent, at 850 deg. C., only 2 per cent methane in the atmosphere is necessary to establish equilibrium and prevent decarburization by the hydrogen. The curve showing the methane content in equilibrium with hydrogen and free carbon is added for convenient reference. This curve, it should be observed, represents the condition of saturated atmosphere and is the same as the curve for methane produced in dissociating a hydrocarbon gas, shown in Fig. 6. In other words, the atmosphere being saturated, it will not take carbon from the steel.

To secure a 2 per cent methane content it is necessary that the gas

be dissociated at 920 deg. C. so that in the case above cited—0.59 per cent carbon steel at 850 deg. C.—the gas from the dissociator at 920 deg. C. would be stable in a furnace at 850 deg. C. and, being neutral to the steel, would have no effect upon it.

How the Gases Affect the Results

Stated briefly, therefore, the hydrogen content of the atmosphere prevents oxidation of the product, and the small methane content prevents decarburization. By simply adjusting the operating temperature of the dissociator, a gas with the proper methane content for equilibrium with any carbon steel, within limits, can be produced.

Some tests on a production scale have been conducted in furnaces using this atmosphere. For example, coils of 0.55 per cent carbon wire, heated to 1300 deg. Fahr. and held 8 hr., show no scale whatever, and the surface shows no decarburization under the microscope. No attempt was made to se-

secure a bright surface, but the annealed wire could hardly be distinguished from the original wire, except that the outside turns of the coils were slightly darker in color.

Sheets for tin plate have been an-

TABLE IV.—RELATIVE COST OF GAS BY VARIOUS METHODS OF PROCUREMENT

Source	Cost per M Cu. Ft.	Hydrogen Present, Per Cent	Reducing Gas Present, Per Cent
Purchased in pressure tanks...	\$10.00	99.0	99.0
Dissociated ammonia	4.00	75.0	75.0
Electrolytic process	2.50	99.0	99.0
Electrolene	0.60*	75.0*	95.0

*Depends on the kind of raw gas used.

nealed in this atmosphere in a much shorter time than required by the usual methods, and come from the furnace perfectly clean.

Coils of carbon steel rod have been normalized and show no decarburization, and the mill scale was nearly all reduced, the product being practically white.

Design of Furnaces Flexible

Furnaces of the type shown in Fig. 9 may be provided with an insulated cooling hood, a plain sheet steel hood, or a hood arranged for air cooling or water cooling, as may be required for the particular work in hand. Cooling pipes may be installed in the furnace chamber, and a blower provided to force air through them to accelerate the normal cooling rate, if so desired.

These furnaces may thus be designed to meet a variety of conditions, with a minimum of heating time and floor space. Development and practical application of this apparatus promises to be an outstanding achievement in furnace engineering, and may profoundly affect many processes.

Hot hydrogen in contact with air is inflammable. This requires that certain elementary precautions

be taken in operating these furnaces. Experience with large units, over a period of years, has demonstrated that there are no unusual hazards involved, and that when properly manipulated such furnaces are as safe as gas-fired or oil-fired equipment.

Advantages to be gained by the scientific use of

gases in industrial operations are manifold, and are becoming better understood by practical men. As familiar examples may be cited atomic hydrogen welding, annealing of electrical sheets in hydrogen, copper brazing, the substitution of city gas for acetylene in flame welding and cutting operations, carburizing with city gas, nitriding and finally the subject of this paper, annealing steel products without scale or decarburization.

In conclusion, the writer desires to acknowledge sources of portions of the subject matter presented. The portion relating to furnace atmospheres has been drawn from the work of Stansel and Dantszen, published in *General Electric Review*, and the reference there cited. The portion relating to production of gases is from the work of F. P. Wilson, Jr., also appearing in *General Electric Review*.

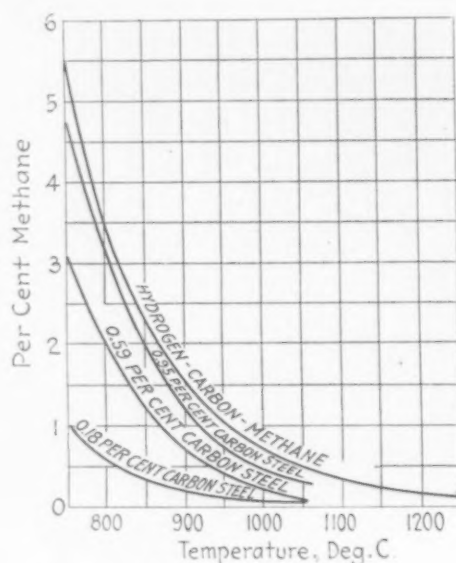


Fig. 10—Percentages of Methane in Hydrogen Atmospheres for Equilibrium with Carbon in Steels of Three Different Carbon Contents

High-Frequency Induction Furnace Operates 24 Hr. on Alloy Steels

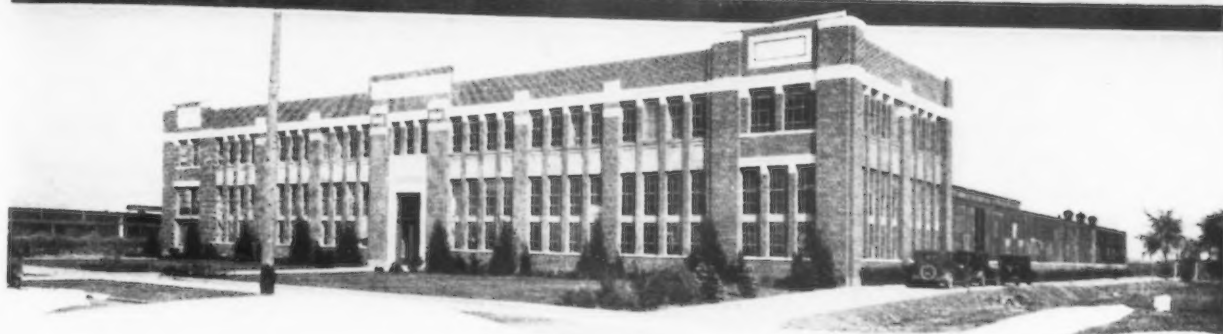
AN interesting description of a high-frequency induction furnace for making alloy steels at the plant of Ed Dörrenberg Söhne, Runderoth, Germany, is given in *Stahl und Eisen*, May 8. This furnace has the distinction of being the first of its kind in Germany to operate on a 24-hr. basis, and has been in operation since last September.

Power is received at 10,000 volts and is stepped down by a 325-k.v.a. transformer to 380 volts. This voltage is applied to a high frequency motor generator of 150 k.v.a. capacity. The heating coil is energized at 1200 volts, 2000 cycles. In the plant layout the transformer and oil switch are in one room, the generator and its control panel in another, and the condensers with their controls in a third. The furnace proper and pouring platform are contained in a bay opening from the condenser room. Special means are provided for circulation of cooling air for the pouring platforms, condensers and generator. The furnace coil is made up of two pieces of flattened tubing, one for the current and one for water-cooling.

Considerable attention has been paid to the matter of the cooling water. All of it is purified before use, about 5 gal. per min. being required. Instruments are provided on the operating floor which show its pressure at the inlet and temperature at the outlet of the furnace coil.

Acid crucibles are generally used, and are made of quartzite. They are given a slight taper from about one-third the way down. It has been found that, although this increases the energy required per ton by about 15 per cent at most, the life of the crucible is approximately doubled, as compared with a plain cylindrical pot. Erosion of the crucibles varies widely with the nature of the material melted. Carbon steel (1 per cent) is the least active, followed by the low-alloy and medium-carbon grades.

Charges of about 600 lb. are made on the average, and require about 600 kw.-hr. per ton to melt from the cold. From a cold charge (with the furnace hot) to the completion of pouring requires 720 to 790 kw.-hr. per ton. The average time from charging to casting is 92 min.



Working Conditions Feature Layout of New Tool Plant

By BURNHAM FINNEY

A MODERATE-SIZED shop with every convenience for its workmen, finding such a policy profitable rather than burdensome; a shop where employees are not surrounded by "DON'T" signs and do not abuse their privileges; one in which modern machinery, the best light and ventilation and efficient production practices are bringing good dividends; a shop which is rightfully called a "shop home":—

This is the impression carried away by the visitor to the new plant of Goddard & Goddard Co., Inc., Detroit, designer and manufacturer of milling cutters and reamers. Employing an average of 150 men, this company has incorporated in its factory many features seldom found outside companies many times larger. Aside from comforts provided for its workmen, the company has in operation a bonus system which has resulted in increased output at a relatively low cost.

Even at this point, interest in the plant does not halt. In some of its machining methods, which incorporate special practices of original design, in the heat-treatment of its product and in its handling of materials in process, it commands attention.

The shop proper is of the one-story, multiple-monitor type, which provides the best possible distribution of light as well as progressive movement of the product from one

department to another. The building is so constructed that the Fenestra sash can be quickly removed, the brick pilasters knocked out and the shop extended for a considerable distance either lengthwise or in width at a minimum of expense and at no sacrifice of lighting conditions.

Tool Crib Open to Workmen

Designed so that all of the shop, with the exception of the heat-treating department, is in full view of the workmen and their supervisors, the building is remarkably free from obstructions. Even the tool crib in the center of the shop is so low in height that it offers no obstruction to free vision of the complete shop area. An unusual feature is the fact that it is

not under lock and key and no one is constantly in charge. An attendant is present only at intervals, as he is assigned other duties. Any workman can go in—there are openings at opposite corners—and help himself to the tools required for his work. He does not leave a check. If the tools are in good condition when he has finished with them, he puts them back in their proper bins; otherwise he lays them on a bench for the attendant to have them put in shape for future use. Employees appreciate that this arrangement is primarily for their convenience and no diffi-

THE belief that quiet, clean and cheerful surroundings have a favorable reaction on employees was an active consideration in designing the plant described in this article. Carefully-planned lighting, heating and ventilating, modern equipment and accessibility of tools and other facilities contribute—with profit to all concerned—to the comfort, convenience and productivity of the men at work

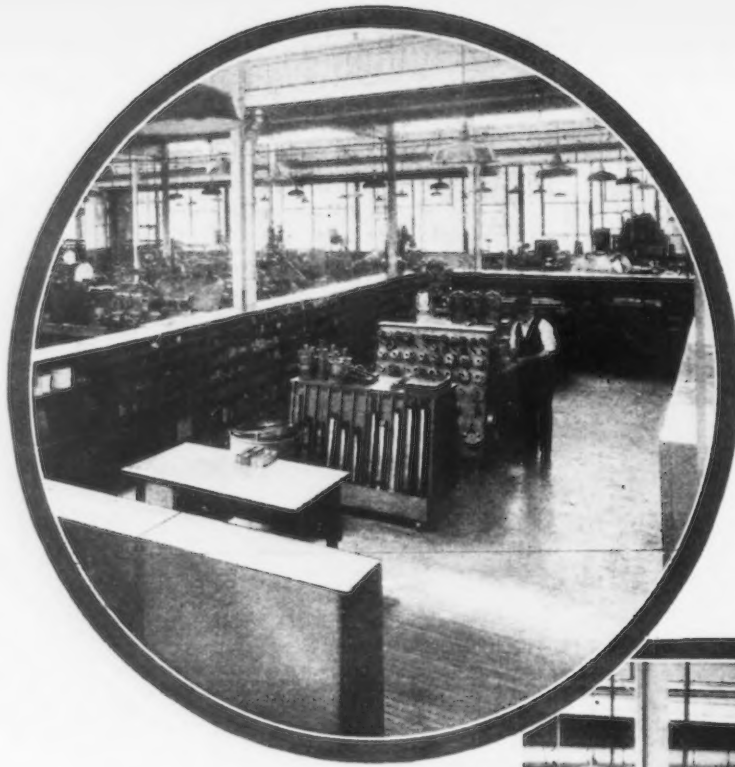
culties have been encountered in following out the plan. All tools in common service, as well as supplies such as emery wheels, oil, waste, and special tools and fixtures, are kept in the tool bins.

There are a number of shop innovations which make it easy for the men to get at their tools, and which save space and protect special machine tool attachments from possible damage. Milling machines, for instance, have cast steel brackets attached to the front left part of the base for carrying overarm supports when not in use. This arrangement protects the supports from injury.

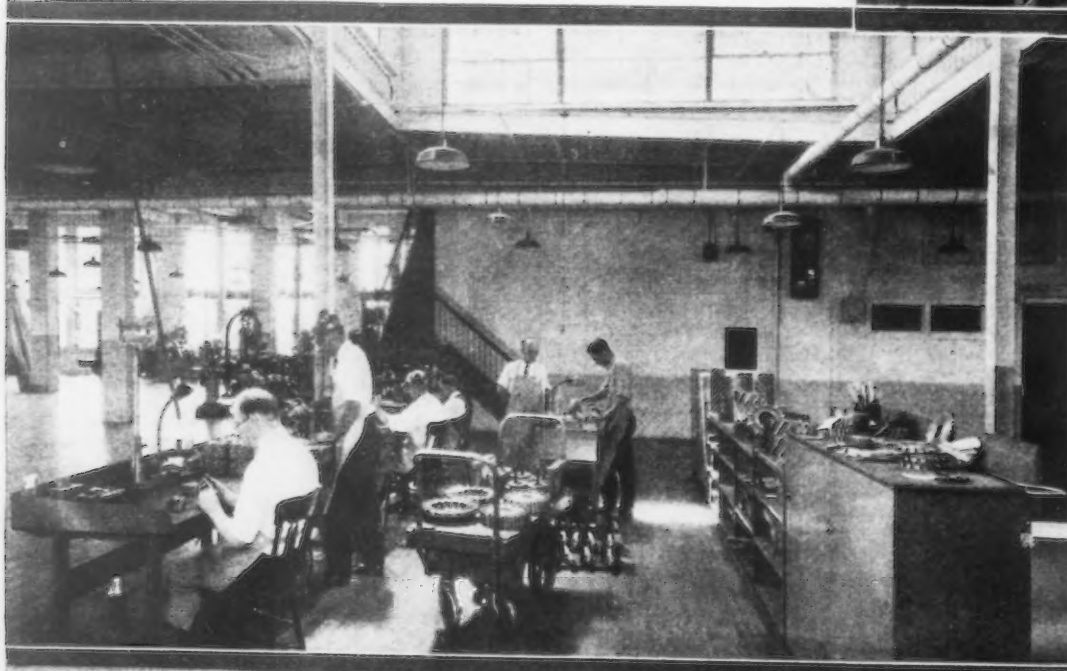
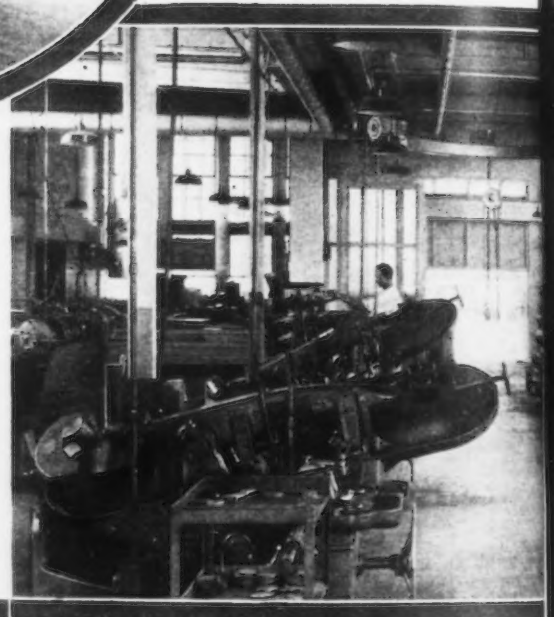
Portable tool racks are another convenience. Equipped with ball-bearing castors they can be moved easily. The result is that tools can be obtained quickly by workmen and can be transported with a minimum of effort, and the floor is kept clean. Incidentally, the absence of window sills and of benches along the walls prevents the almost inevitable clutter and dirt which they invite.

All machine tools have been motorized, thus eliminating overhead belt attachments. This gives freedom of distribution of light from the monitors and eliminates the dinginess which accompanies the use of belts, pulleys and shafting.

In the grinding department cutter-sharpening and other dry



Low in height, the tool crib in center of shop does not obstruct free view of entire manufacturing area. No attendant is constantly in charge, and workmen have free access to tools and supplies.



For the inspection room, diffused light from the monitors was found preferable to direct light from side windows. Because of this the inspection department is located near center of shop.

▲ ▲ ▲
 Dry grinding machines (at right) have dust exhausts connected with main dust collecting system

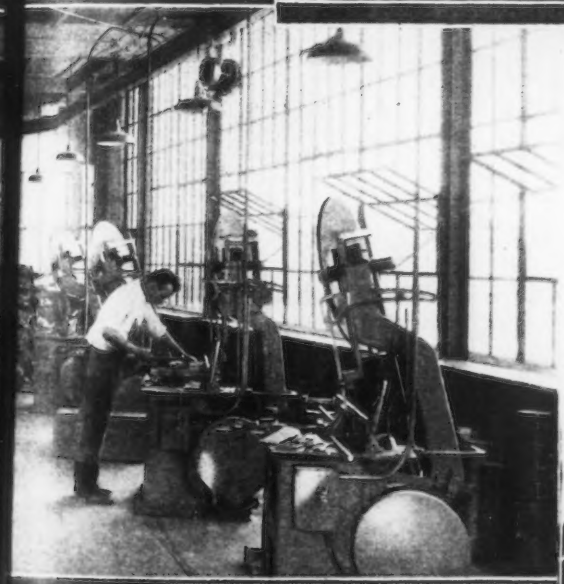
Below) The monorail trolley extending from receiving platform to cutting department serves both the stock racks and the hand-saws

▼ ▼ ▼



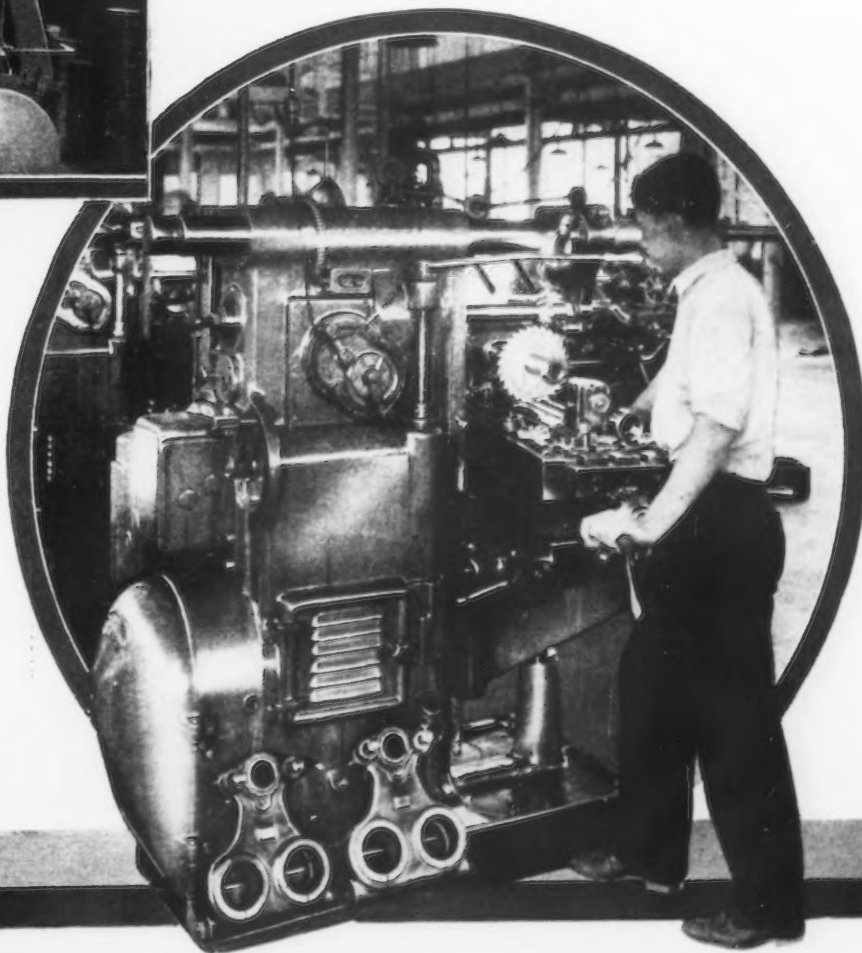
grinding machines have dust collectors connected with a main dust collecting system. Ball joints at each outlet allow flexibility of the suction pipe as it is attached to each machine. The entire piping and the dust collector are painted with aluminum paint, thus offering no interference with the light.

Housed in a separate building adjoining the main shop is the heat-treating department, which is equipped with four gas-fired Strong, Carlisle & Hammond furnaces of two-stage type. High-speed steel cutters are preheated in these furnaces to a tempera-



▲ ▲ ▲
 Cast steel brackets attached to the base of milling machines carry the overarm supports not in use, protecting the supports from injury and keeping the floor uncluttered

▼ ▼ ▼



ture of 1650 to 1700 deg. Fahr. and then raised to 2350 to 2400 deg. The material is quenched in large circular oil tanks, the oil being maintained at a uniform temperature by means of a circulating system which changes the entire volume continually by passing it over a bank of water-cooled pipes. Experience has shown the company that this method is preferable to the standardized system of cold-water coils in the oil tank. The uniformity of temperature and of oil density results in better hardening of the steel than by the older process.

High-Speed Steel Hardened in Molten Salt Baths

In the heat-treating department is a battery of molten salt baths, as this method of heat treating high-speed steel offers some advantages not obtainable in gas-fired furnaces. For example, heat trans-

matically controlled by regulating valves in the gas and air lines which are electrically operated through a Wilson-Maeulen control system.

The receiving entrance for raw materials is designed for truck deliveries, a ramp bringing trucks to floor level for easy unloading of machines or heavy materials. A monorail trolley extends from the receiving platform into the cutting-off department, serving both stock racks and the band saws. Stock bins are located under the windows for the storage of high-speed forged blanks. The monorail not only reduces the cost of handling material by hand, but overcomes the danger of free handling of heavy stock.

All Work Is Process Inspected

All work going through the shop is subjected to process inspection following each operation. More-



Heat-treating department is housed in separate building. Equipment includes four gas-fired furnaces and battery of molten salt baths (latter not shown). Note provision for ventilation in side walls and roof

fer from a liquid to a solid is much more rapid and more uniform than between a gas and a solid. Moreover, in passing work from preheat pot to high heat pot and then from the latter to the quenching pot a film of the molten salt adhering to the tool positively protects it from atmospheric contact, thus overcoming oxidation found in the gas-furnace method and also protecting the tool from sudden chill in passing from one zone of heat to another. Tools, therefore, are hardened with less distortion by this method, which is of special value in connection with treating tools of delicate and intricate design.

The heat-treating department is painted black to give uniform visibility at all times, regardless of daylight conditions. Artificial light is supplied to the extent necessary for safety. Protected by inside louvres against penetration of light, large windows in the side walls and ventilators at intervals in the roof give abundant fresh air. Furnaces are auto-

over, it must pass a rigid final inspection before it goes to the shipping department. The final inspection department is situated in the center of the shop at a considerable distance from the side windows, the exceptionally fine diffusion of light from the monitors being found preferable to the direct light from the side windows.

Since the plant is in a semi-residential section considerably removed from a business district, the management has established a cafeteria for the employees on the mezzanine floor. The kitchen is equipped with gas stove, hot plates, electric refrigeration and soft drink cabinets. Food is served at low cost. The company installed all of the equipment and meets the maintenance charges, allowing two attendants to get their incomes from profit on the food and drinks served. Any employee is privileged to leave his work at any time to go to the cafeteria to get a cool drink or ice cream.

▲ ▲ ▲
*The circular enamelled
 sinks in the wash room,
 each with ten individual
 sprays of warm water,
 afford accessible wash-
 room accommodations for
 the workmen*
 ▼ ▼ ▼



▲ ▲ ▲
*Food is served at low
 cost in the employees'
 cafeteria (shown at left).
 The company installed
 all equipment and meets
 maintenance charges*
 ▼ ▼ ▼

Wash and locker rooms are also located on the mezzanine floor. Circular enameled sinks in the wash room afford maximum access for the workmen. There are 10 individual sprays of warm water at each sink so that every man has an abundance of clean water, and the possibility of a man following another and washing in his dirty water is avoided. Incidentally, the heat-treating department has its own wash room, lockers and shower baths in rooms adjoining the department.

The office of the company occupies a two-story section at the front of the plant. This section is of reinforced concrete construction, faced with brick and trimmed with stone. Between the first and second floors is a mezzanine floor for the locker and wash rooms and the cafeteria. The roof is designed so that a third floor can be added if future needs demand it.

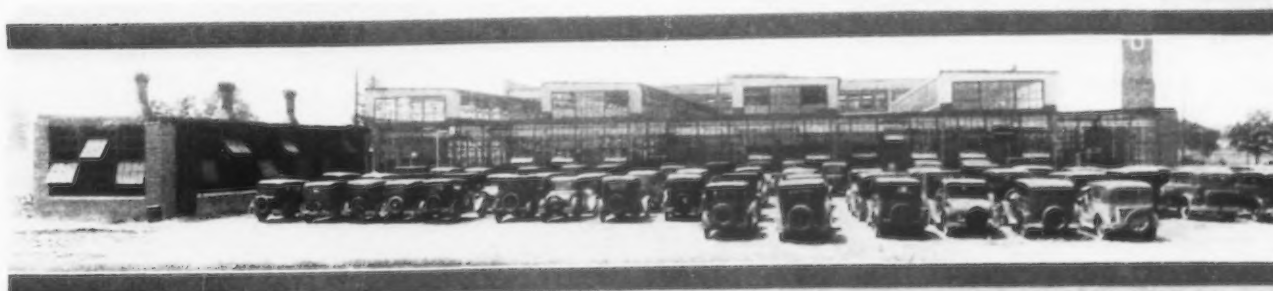
Located in one corner of the second floor of the office section, the engineering department has the advantage of uniform light distribution by means of flood daylight diffused from soft, green-tinted walls. Indirect ceiling lighting gives equally efficient working conditions at night.

At the rear of the shop is a spacious parking area for employees' cars.

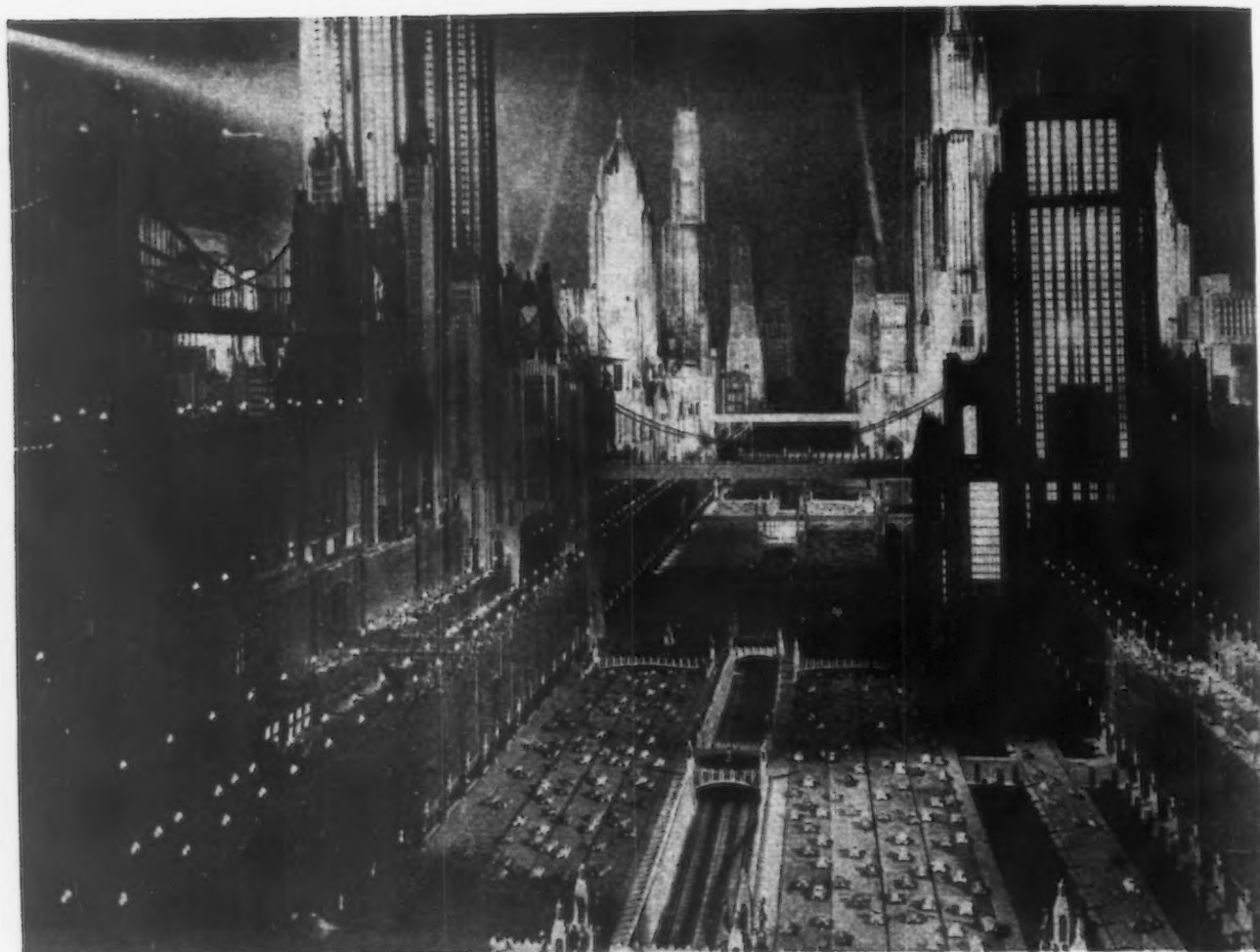
The shop itself has steel and brick walls with full Fenestra sash in the side walls and monitors, thus giving maximum daylight. The roof is steel-decked with five ply of Celotex, each ply being mopped on with tar. This construction offers insulation against heat in summer and cold in winter. Power for operating the shop comes from electric current received outside the plant at 46,000 volts and stepped down through transformers to 220 and 110 volts.

The shop is heated by the unit system of banks of steam pipes inclosed in sheet metal and suspended at proper intervals in the monitors. A small motor-driven blower in connection with each unit takes in the warm air, which naturally rises to the highest point of the monitor, and distributes it through vents directed toward the floor at various angles. Thus, heating and ventilating are accomplished at the same time. These units are thermostatically controlled and so uniformity of temperature is automatic. The steam plant supplying heat is located in a basement

(Continued on page 903)



Parking space for employees' cars is provided at the rear of the plant



THIS impressionistic model of "The City of the Future" recalls vividly our youthful skepticism of the "voyages imaginaires" of Jules Verne, most of whose fantastic dreams of future wonders we have seen come to pass. Science and mechanical ingenuity have advanced so far since the days of Jules Verne's early writings that we no longer look with awe and amazement on fanciful conceptions of future developments. While this model of the future city is only a setting for a movie, "New York of Tomorrow," soon to be released, it is based on the plans which many architects have drawn of what may eventually occur in a city such as New York. Airplane landings on the roofs of buildings, streets set apart for motor traffic, with elevated highways for pedestrians, are even now being given serious consideration in plans for the greater city of tomorrow.

Roller Bearings in Rolling Mills

By G. E. PALMGREN*

PROBLEMS encountered in fitting roller bearings to rolling mills have many times been baffling. Some of the solutions to these problems, as worked out by European engineers, are set forth here. They differ in some ways from American methods.

EXPERIMENTAL work had not been long under way when an interesting point was observed. Every rolling-mill engineer knows that where plain bearings are used, and especially in heavy mills, ordinary muff couplings easily cause trouble and eventually break. Difficulties in production are caused also through crookedness at the front ends of the rolled metal, which is produced through play in the couplings and the consequent unevenness of the turning movement of the rolls at the moment when they grip the metal.

These drawbacks are generally ameliorated by mounting plain bearings so as to produce a more powerful brake effect, great enough to prevent play in the couplings. When roller bearings are employed this braking is entirely dispensed with. In the case of a 17-in. roughing mill with roller bearings at Hofors, it soon became clear that special measures were necessary. Several muff and spindle breakages occurred, although the dimensions of the coupling were the same as before. And the bends in the rolled steel were so troublesome that they impeded production. As a provisional measure, brake disks were then mounted on every roll-neck at the free end of the mill, a brake effect of 5 kw. being found necessary.

Since it could hardly be regarded as a sound principle first to eliminate friction from the bearings, and then to introduce it at another place, even if the friction added were considerably less than that taken away, efforts were directed toward providing a coupling which would enable the driving power to be

transmitted at an angle, without producing play in the direction of turning.

This problem, too, has been solved in a satisfactory manner, although not until several attempts had failed. The roll-necks are now made with extensions having two surfaces slightly inclined toward one another, as is shown in Fig. 2. On these surfaces is placed a universal coupling particularly simple to assemble and take to pieces.

Next to the roll-neck is a fork (1) open on one side and provided with two trunnions (2) on which two rectangular washers (3) are supported. These washers are cylindrical externally and are provided with a flange (4) which engages in a drilled out groove in the head (5) of the coupling. The coupling is secured by means of a simple locking device (6) which can easily be assembled and disassembled, and which at the same time is entirely reliable.

When the coupling is removed from its position, all the parts except the locking device are held together as one unit. The coupling is used in several rolling mills, as will be seen from the illustrations.

When the new universal coupling is used, the mill operates remarkably evenly, and the roll-necks do not become worn. Rolls do not therefore have to be scrapped on account of worn-out driving necks. Another important advantage is that the roll-necks can be made longer, and that the best arrangement of bearings can be used without its being necessary to

increase the space between the stands, for the coupling requires much less space longitudinally than the old muff couplings.

It has already been

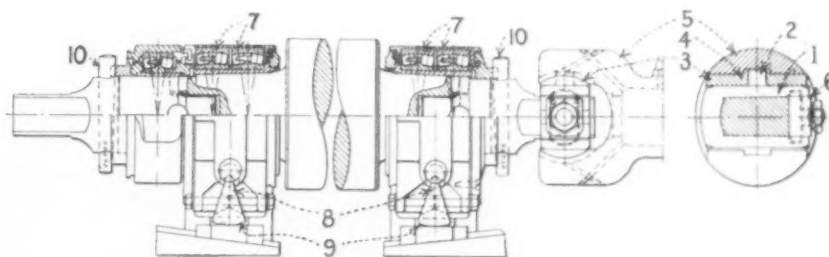


Fig. 2.—Section Showing Bearings for the Bottom Roll, the Lengthening of Old Rolls, and the Universal Coupling

* SKF Industries. This is the concluding portion of an article of which the first installment appeared Sept. 18, page 778.

pointed out that old rolling mills should be capable of reconstruction. If this is to be possible one of the first essentials is that the necks of the old rolls should be capable of being lengthened so as to be suitable in form for the bearing design described. This has been found to be quite feasible, and Fig. 2 shows how the extension is made.

The old neck is cut off and is provided with a roughly threaded bore in which a new steel neck is screwed, and then locked by means of four strong,

lower parts by means of comparatively weak screws or the like, screwed into the casting and liable to lengthen under load. The new arrangement shown, on the other hand, enables the connection to be of such substantial dimensions that the flexibility is no greater than in a housing cast in one piece. And the heavy key makes secure tightening and quick removal possible.

The lubrication problem has now been solved so effectually that water may be allowed to enter the

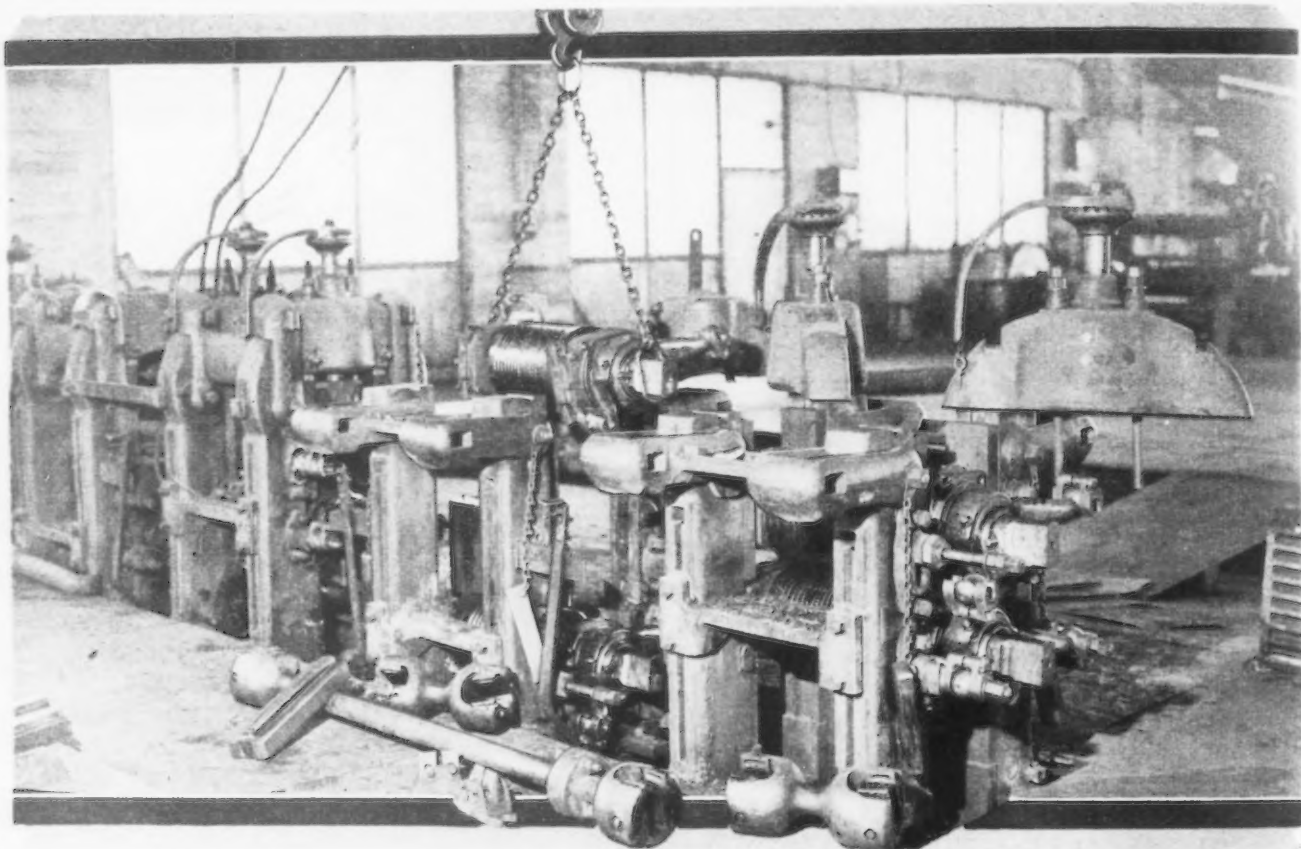


Fig. 9.—Changing Rolls in a 10-In. Three-High Rolling Mill Equipped with SKF Roller Bearings

round, radially placed plugs, the function of which is to transmit the torque. Necks extended in this manner have been largely used, always with good results—in the first stand of the wire mills as well as in the medium mills in which *inter alia* broad steel bands are rolled.

This design, moreover, enables the rolls to be changed as quickly as when plain bearings were used, or even more quickly. A condition, however, is that the housings must be made with loose tops, permitting the rolls and bearings to be lifted out and the bearings to be removed from the roll-necks. Another method is to change the entire stands.

Fig. 9 shows how the rolls in a 10-in. rolling mill are changed. The bearings can be fixed to or detached from the housings in an instant. Old housings made in one piece can, moreover, be easily altered. The top is merely cut off and joined on to the frame again by means of a pair of stirrups placed over the top piece, as shown in Fig. 8.

Objections many users have to housings with loose tops are natural where the top is joined on to the

bearings. The lubricant absorbs the water and prevents the formation of rust. The method of lubrication employed has been found convenient and a very efficient protection against corrosion.

Results Obtained

AS mentioned above, several rolling mills have during late years been equipped with roller bearings, and the bearing applications were, to begin with, of various designs. The design described above has, however, been found to be superior and has therefore been substituted for the earlier designs.

As an example of the life which may be obtained with SKF bearings, particular mention should be made of the rolling mill in Czechoslovakia which has now been in operation for seven years. The production of this mill is between 100 and 225 tons each shift.

Proofs of the remarkable carrying capacity of the bearings is provided by the results obtained by their use in the 14-in. medium rolling mill at Hofors. This mill is used for rolling round chrome steel 1 in. to 3 in.

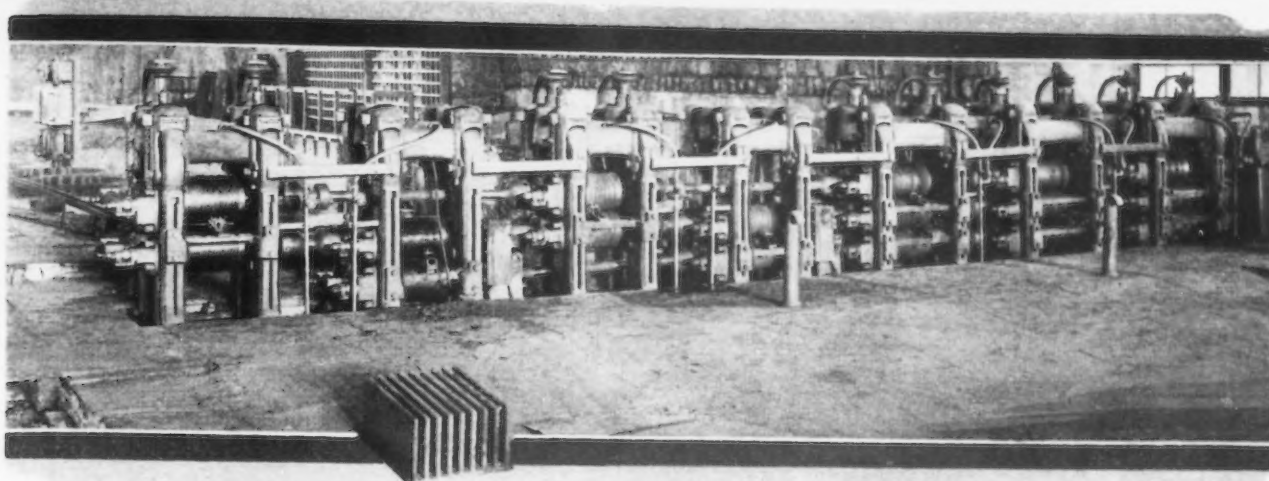


Fig. 7.—Three-High 10-In. Rolling Mill with SKF Roller Bearings

in diameter, strip steel 2 in. to 5½ in. wide and 2 mm. (0.08 in.) thick, and soft strip of a maximum width of 7 in.

When roller bearings were mounted in this mill, it was the intention of the management to increase the speed when rolling strip, so that the strip could be finished at a higher temperature, and the roll-necks therefore be made somewhat smaller in diameter. For certain reasons, however, the speed was not increased. The final temperature of the strip is therefore still low, and the loads in the last stands very great—40 to 50 tons maximum on each neck.

Since roller bearings were mounted, some thirty fractures of rolls in the last stands have taken place, without causing the slightest damage to the bearings. On no occasion, moreover, did the knife edges which support the bearing housings become broken. The only damage was sustained by a couple of details in the couplings. With the object of preventing the breakage of the roll-necks, previously a frequent occurrence, the rolls of the last stands have now been provided with steel necks fixed in the rolls. Up to the present these shafts have functioned well.

Low Power Consumption Assured

That a rolling mill provided with roller bearings consumes much less energy than a similar mill with

plain bearings has been fully confirmed at Hofors, as well as at other works where roller bearings have been fitted. Measurements taken in the wire rolling mill at Hofors have shown that the saving in the total power during long periods of rolling is:

In the 17-in. roughing mill, 35 to 39 per cent.

In the 9-in. finishing train, 40 to 42 per cent.

In Table I the results are given in greater detail. It has unfortunately not been possible to make comparisons covering a period of years, because the material chiefly rolled since the mill was converted differs as regards quality and dimensions from that rolled before that event. Diagram 10 shows the effect curve at rolling a 50-kg. billet.

Some comparisons have been made also in the case of the medium mill, when it was used for rolling strip. There are six three-high stands, of which the first carries the roughing rolls with diamond-shaped passes, the second is a universal, and the third to the sixth stands may be used as reversible stands, when strip rolling takes place. In the two first stands the material has to run out after the various passes, but in the four last stands the material travels backward and forward from stand to stand. The two first stands are still provided with plain bearings like the pinion stand. The four last stands are provided with roller

Fig. 8.—Three-High 14-In. Rolling Mill with SKF Roller Bearings

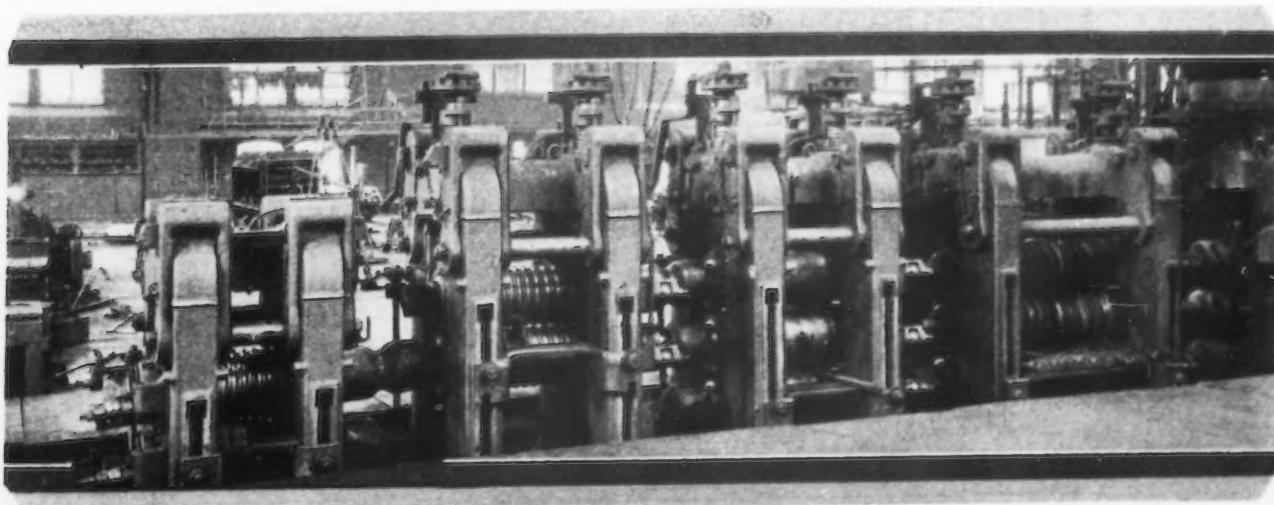


Table I—Power Economy Measurements in Wire Rolling Mill

Bearing Type	Dimension, mm.	Material	Number of Lots	Number of Tons Rolled	Power Consumption Kw/hr. per Ton Rolled			Mean Effect Kw.			Saving, Per Cent	
					Min.	Max.	Average	Min.	Max.	Reduced to Ton Hour		
										age		age
Rolling in the roughing mill of 3½ in. square blanks to ¾ in. square in nine passes												
Plain bearings.....	..	0.85 to 1.10% C.	11	98.6	35.8	59.5	48.0	76.0	138.0	2.2	105.0	..
Roller bearings.....	..	0.95 to 1.05% C.	8	71.2	27.10	35.2	31.2	...	...	2.2	68.5	35.0
Plain bearings.....	..	1.15% C., 0.35% Cr., 0.30% Mn.	14	167.1	53.5	87.6	62.8	80.0	143.0	1.6	100.0	..
Roller bearings.....	..	1.15% C., 0.35% Cr., 0.30% Mn.	16	140.5	29.0	55.0	38.05	...	...	...	60.6	39.4
Rolling in the finishing mill in 14 passes from ¾ in. square												
Plain bearings.....	5.5	0.85 to 1.10% C.	11	96.7	140.5	211.0	176.0	282.0	483.0	2.2	387.0	..
Roller bearings.....	5.5	0.85 to 1.10% C.	8	69.40	84.0	112.5	101.2	...	...	2.2	223.0	42.4
Plain bearings.....	5-5.5	1.15% C., 0.35% Cr., 0.30% Mn.	7	96.16	157.0	247.0	193.7	270.0	380.0	1.6	309.0	..
Roller bearings.....	5.0	1.15% C., 0.35% Cr., 0.30% Mn.	5	52.1	103.0	125.0	114.5	...	...	1.6	183.0	40.0

bearings. The plain bearings were of phosphor bronze with babbit linings. The speed of rotation was 150 r.p.m. At the same time the roller bearings were fitted, the diameter of the rolls in the last stands was increased, so that in the last stand of all it reaches 400 mm. (15½ in.) instead of 350 mm. (13¾ in.), which was the maximum diameter before conversion took place.

Power consumption when the mill runs idle has been found to average 145 kw. when plain bearings are used throughout the mill, and 50 kw. when roller bearings are used in four stands. The saving is therefore about 62 per cent.

When strip steel was rolled the figures given in Table II were obtained. The saving effected by the use of roller bearings, as the table shows, is between 40 and 50 per cent of the total current transmitted to the motor. This result is worthy of note, for a large number of passes are made, the thickness of the strip being thus reduced from 4.5 mm. to 2 mm.

Table II shows also that an increase in production, up to 9.5 per cent, has been obtained. The reasons for this increase are no doubt that the rolls maintain their position better, thus requiring from the operator less attention and subsequent adjustment than was formerly the case, and that the mill now maintains its speed better. The great reduction in frictional resistance is shown by the diagrams in Fig. 11.

As has already become generally known, and been proved in many steel works, roller bearings if correctly made are practically free from wear. This means that the passes in the rolls, once correctly adjusted, maintain their positions better than formerly. Rolling

with roller bearings is therefore much easier than with plain bearings and is very accurate.

There are of course a number of other factors affecting the possibility of rolling to narrow tolerances. Among these are the accuracy with which the grooves are turned, wear of the grooves, variations of temperature, and the skill of the operator.

To obtain an idea of the operation under practical conditions, where the gang boss is at liberty to inspect and gage all dimensions and to make the necessary readjustments, measurements have been carried out during various rolling operations.

Chromium steel 30-40 mm. in diameter was rolled without the gang boss being cognizant of the fact that the material produced was being subjected to examination. The figures obtained were treated in various ways, as for instance that shown by Fig. 12. The ordinate indicates the maximum variation of the diameter of each bar above the smallest one measured, and the abscissa the percentage of the total number of bars to which the indicated diameter variation is confined within the values given by the curve.

Full line indicates rolling with plain bearings, and dotted line indicates rolling with roller bearings in the same train with the other arrangements unaltered. It is particularly noticeable, in the important percentage group 90-100, that the roller bearings gave better results.

It should here be especially observed that the rolling was carried out on several occasions, i.e., many unfavorable periods of adjustment are included. The same tolerance stipulations were applied all the time, this meaning that the gang boss did certainly not al-

Table II—Power Economy Measurements When Rolling Steel Strips in Medium Mill

Diameter, Mm.	Carbon Contents, Per Cent	Number of Lots	Rolling Time, Hours	Power Con- sumption, Kwhr.	Number of Tons Rolled	Average		Savings		Pro- duction Increase, Per Cent
						Produc- tion, Tons an Hour	Power Consump- tion, Kwhr. per Ton	Kwhr. per Ton	Per Cent	
Plain bearings in all six stands										
103 x 2.....	1.0	10	63.9	18.200	97.78	1.53	187.0	...	...	..
93 x 2.....	1.0	21	86.3	21.400	138.95	1.61	154.0	...	...	..
83 x 2.....	1.0	23	71.1	19.070	130.33	1.84	146.0	...	...	..
70 x 2.....	1.0	8	34.9	8.380	56.50	1.62	148.0	...	...	..
Roller bearings in stands 3 to 6										
103 x 2.....	1.0	8	22.0	3.419	36.97	1.675	92.5	94.5	50.5	9.5
93 x 2.....	1.0	16	89.2	14.288	155.22	1.74	92.0	62.0	40.5	8.0
83 x 2.....	1.0	17	63.9	10.380	124.48	1.95	84.0	62.0	42.5	6.0
70 x 2.....	1.10-1.15	7	10.3	1.464	16.52	1.60	88.6	59.4	40.3	0.0

ways utilize the possibilities offered by the roller bearings.

If the rolls with roller bearings were adjusted only so that the dimensions of the steel produced

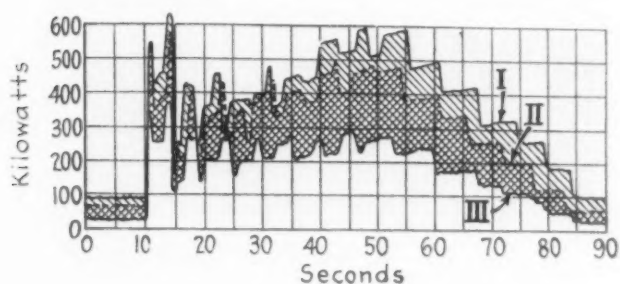


Fig. 10

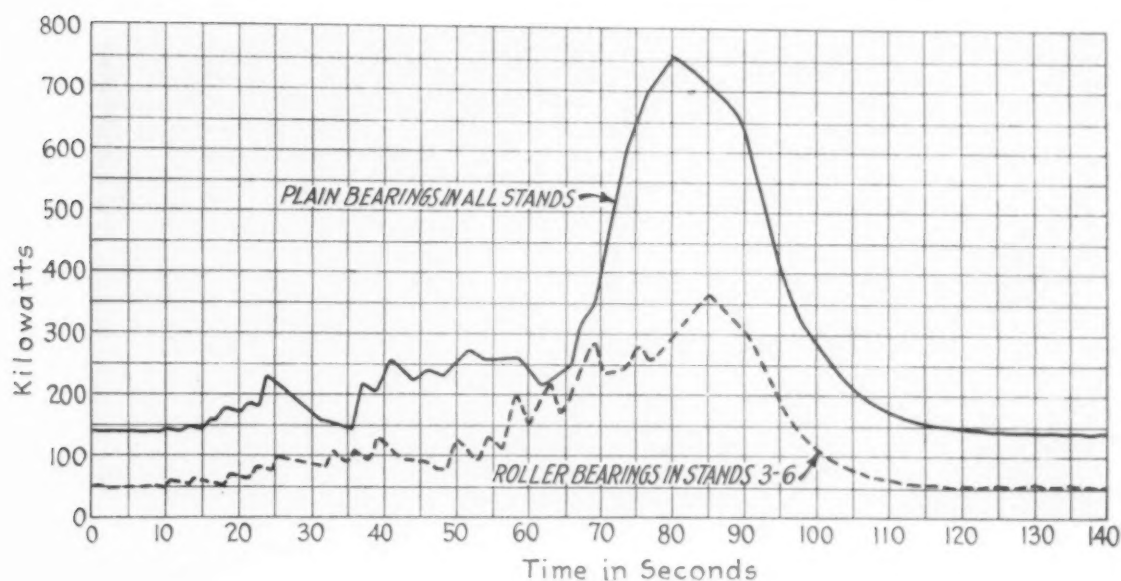


Fig. 11

FIG. 10.—Power Consumption When Rolling, in 9-In. Wire-Rolling Mill, 5.4-mm. Wire, of Material Having 0.90 Per Cent Carbon, in 14 Passes, from $\frac{3}{4}$ -In. Square. Plain bearings absorbed 198 kwhr. per ton and 162 kwhr. per ton in two cases. Fitted with SKF roller bearings the power needed was 97 kwhr. per ton. Weight of billet, 110 lb.

Fig. 11.—Power Consumed by a 14-In. Three-High Mill in Rolling Steel Strips 92 x 2 Mm. Speed of rolls 150 r.p.m.; weight of billet 102 lb.

Fig. 12.—Frequency Curves Showing the Difference Between the Maximum Variation in Diameter of Each Bar and the Smallest Measured. Normal rolling with guide, 30 to 40 mm. diameter.

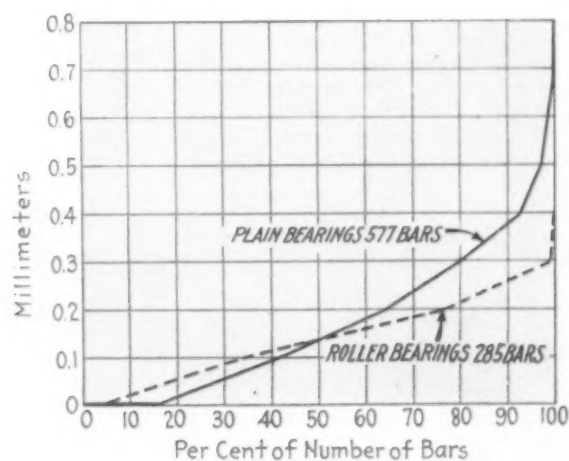


Fig. 12

CONSUMPTION of steel in Germany for non-industrial buildings, that is, office buildings, public buildings, dwellings, etc., increased from about 70,000 tons in 1927 to about 250,000 tons in 1929. "The use of steel doors has increased by 65 per cent, of steel windows by 113 per cent, and of steel furniture by 72 per cent. While in 1929, due to the most unfavorable economic conditions in Germany consumption fell off considerably in nearly all lines of

were to be found within the stipulated tolerance limits, the gang boss was satisfied and continued the rolling even if it might have been possible to obtain better results. If the tolerance stipulations had been stricter, the result would certainly have been still more obviously in favor of the roller bearings.

The report above refers only to ordinary hot-rolling mills. In mills for sheet rolling and cold rolling the conditions are different as regards the requirements to be filled by the bearings. Other applications especially designed for these mills have been prepared, in which the principles mentioned above with respect to correct distribution of the load on the bearings have been maintained, while at the same time it has been possible appreciably to simplify the design.

business, the use of sheet steel has increased by 510,000 tons, which means an increase of 13 per cent against the preceding year. Otto von Halem, director of the Beratungsstelle fuer Stahlverwendung (advisory committee for the promotion of the steel industry of Germany), Duesseldorf, gave these figures in a brief address before the American Institute of Steel Construction in New York, Sept. 16.

Scale and Oxide Removed Rapidly by Electrochemical Process

FURTHER data relating to the Bullard-Dunn electrolytic process for cleaning metals, which was described in THE IRON AGE, March 27, page 947, was made available at a recent demonstration at the plant of the Bullard Co., Bridgeport, Conn.

This process is an electrochemical method of removing scale, oxides, grease and dirt from metal surfaces by the action of hydrogen, electrically generated on the surface of the metal beneath the scale or oxide. The hydrogen bombards these materials from the surface of the metal. A feature of the process is the protection of the surface being cleaned from pitting, etching and from embrittlement by the hydrogen.

This is accomplished in the electrolyte by an instantaneous coating of the surface of the material with a very thin film of lead as the scale, etc., drops off. The cleaned surface of the original metal suffers no reduction in bulk by erosion, regardless of the length of time it is immersed in the electrified solution. As previously indicated the ability of the process to reach and thoroughly clean recessed surfaces, usually quite inaccessible, is a feature.

Emphasis is put on the fact that the entire process is extremely simple. It operates over a wide range of temperature, current density or solution concentration, thus eliminating the necessity for close control. Skilled operators are not necessary, an ordinary shop man being able to produce

consistent results after brief instruction.

As shown in one of the illustrations there are two large tanks or cells containing the electrolyte. One solution is acid and the other is alkaline. The anodes in each tank or cell are long slabs of metallic lead. The material to be cleaned forms the cathode. As soon as the piece to be treated is cleaned in the electrolyte, a fairly violent ebullition of hydrogen is observed and the thin coating of lead is immediately deposited, as demonstrated to those present.

The acid electrolyte is made up of 3 oz. of sulphuric acid, 3 oz. of hydrochloric acid, and 3 oz. of sodium chloride (ordinary salt) per gal. of water. The alkaline electrolyte is made up by adding 3 oz. of soda ash, 4 oz. of tri-sodium phosphate, and 9 oz. of caustic soda to one gal. of water. This is primarily for the removal of grease and dirt; it may also be used to de-scale though its operation is slower. It has unusual throwing power.

SUSPENDED in the acid tank is the material being cleaned. The lead cathodes hang from the two sides of the tank. The left-hand cell is the alkaline one, primarily for removing grease and dirt. Between them is switch for reversing current.

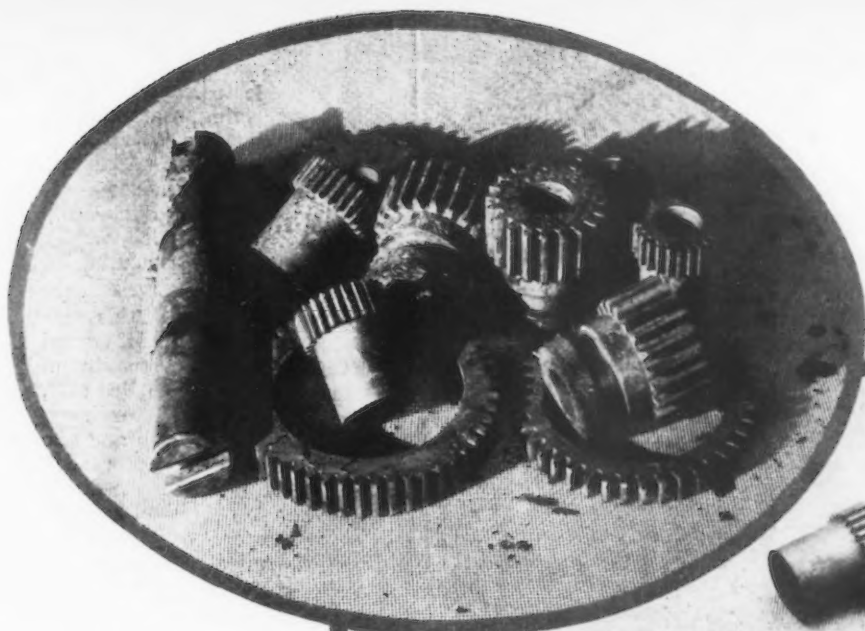
These are the solutions which have been found eminently successful by the Bullard company. Opposite the two tanks containing the electrolyte are two smaller tanks, one containing hot water and the other cold water, used for rinsing the materials after cleaning.

Naturally it is in many cases desirable to remove the lead from the cleaned surface of the material. This can be done very easily by placing the object in the alkaline cell and reversing the current, the lead disappearing almost immediately. There are cases, however, where it is advantageous to leave the extremely thin lead coating on the material.

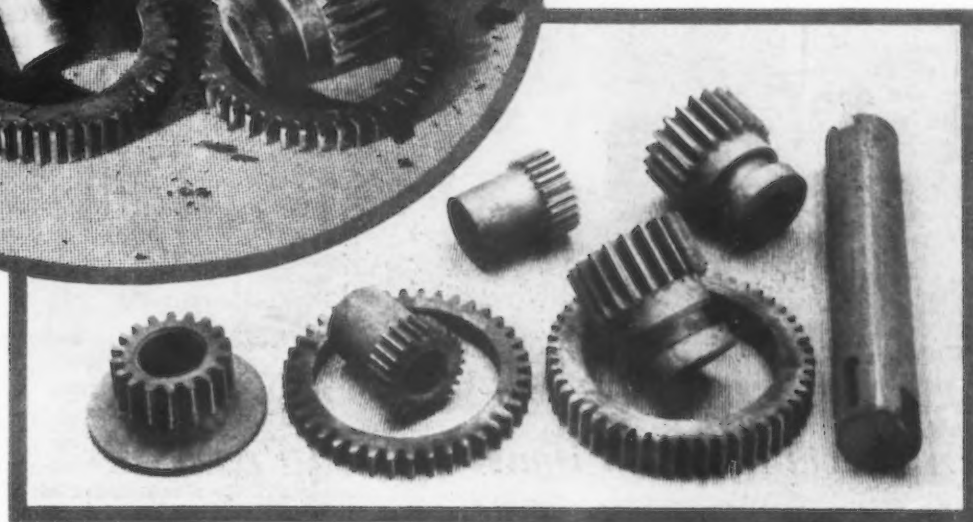
For example, in materials which must go through the process of deep-drawing, the lead has a lubricating effect which adds to the advantage of the process aside from the elimination of scale. It is known that, in deep-drawing operations, the scale formed in each anneal is detrimental to the useful life of dies and punches as well as to the finish of the work. It has been found that intricate dies may be thoroughly de-scaled, easily and rapidly, after hardening and drawing or because of any other reason.

It was emphasized that, in the fabrication of stainless or rustless steel, there is formation of chromic oxide, which is an exceptionally abrasive material and which is a result of the heat treatment of these alloy steels; and that the oxide can be re-





*A GROUP
of gears
(above) which
are covered with
scale and oxide.*



*THE same pieces (be-
low) after being
cleaned by the Bullard-
Dunn process. Teeth,
bores, keyways and other
interstices are thoroughly
cleaned.*

moved by the process. With such materials the time required to remove the scale or oxide takes a little longer than with ordinary steel products.

Attention was called to the fact that the deposit of lead on the cleaned surface is so minute that its coverage is unusually thorough. It is suggested that such a surface is eminently suited for further electroplating.

In the Bullard plant the Bullard-Dunn process is used for cleaning parts ranging in size from small screws and nuts to finished and hardened gears, shafts and all sizes of forgings. A demonstration of a large assortment of parts of simple and complex design, which were heavily scaled and which had been cleaned by the process, were exhibited. These included files (which demonstrated the throwing power of the process); chasers of fine pitch; stainless steel knives; hardened worms; large cams; and ring gears with keyways and recessed spiral on the back. The process is also applied to cleaning aluminum alloys.

A striking illustration of the contention that the material, so treated, is unaffected by the electrolyte was the immersing of a small spiral watch spring in the electrolyte which was left there about 25 min. When it was taken out, it was covered with lead which was removed as indicated above, the resulting product retaining its original dimensions and elasticity.

The company is prepared to license the process and several such contracts have been made. As to cost, it is claimed that the speed of the process,

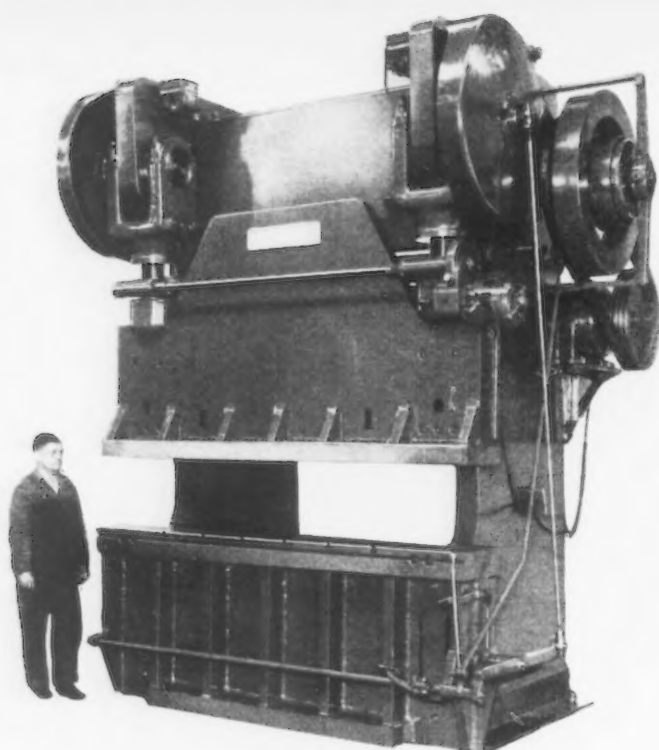
together with the cheapness of the materials used, makes it cheaper than other metal-cleaning processes.

Linde Air Products Co., Oxweld Acetylene Co., Union Carbide Sales Co., Haynes Stellite Co. and the

Prest-O-Lite Co., units of the Union Carbide & Carbon Corp., New York, will exhibit jointly at the International Petroleum Exposition to be held in Tulsa, Okla., Oct. 4-11. A feature will be a guessing contest of the tensile strength of oxy-acetylene welded coupons.



Some forgings and a slotted shaft before and after cleaning. With forgings the machining after cleaning is easier and a deeper cut is possible



All-Steel 300-Ton Double-Crank Press

A 300-ton single-acting double-crank press, all the main members of which are made of rolled steel plate, has been completed by the Cincinnati Shaper Co., Cincinnati. Welding was used throughout, the welded steel construction of the bed and ram being plainly shown in the illustration.

Housings are 5¾ in. thick and the ram plates are 4 in. thick. The stroke of this press is 3 in.; motorized adjustment of the ram is 6 in.; die area

of the ram is 16½ in. by 8 ft.; die area of the bed is 17½ in. by 8 ft.; the shut height is 20 in.; and the depth of throat is 10 in.

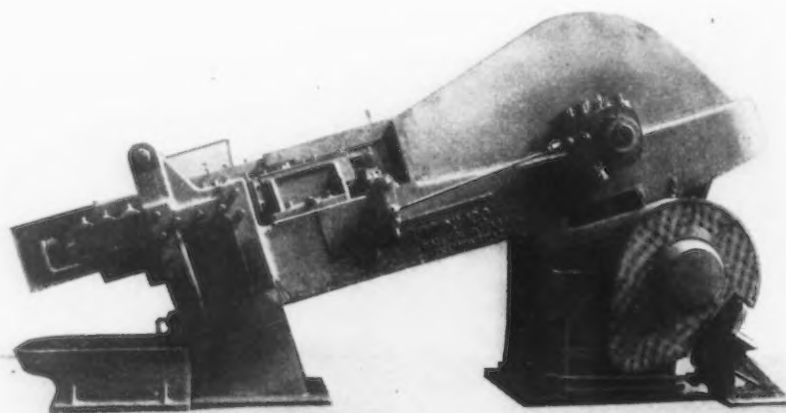
In addition to welded steel construction, features include automatic oiling, V-belt drive to the flywheel, bronze-bushed eccentric bearings, and flywheel and ram adjustment mounted on anti-friction bearings. The machine illustrated will be used for multiple punching and riveting.

Heavy Thread Roller for Large Bolts

INCREASING demand for large-diameter bolts having rolled threads, such as tunnel bolts and track bolts, has resulted in the recent development and manufacture of a large inclined thread-rolling machine capable of handling work of this kind on a quantity basis. The machine illustrated, known as the No. 100 screw thread rolling machine, is the product of the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

It is similar in design to the other thread rollers built by this company, the characteristic of which is the inclination of the dies, one of which is stationary and the other reciprocating. The dies are essentially blocks of steel, about 26 in. long, 8 in. wide and 3 in. thick, with thread grooves cut at the helix angle of the thread in the die faces, and set in relation to each other so as to produce a thread of accurate lead and exact form when the blank is rolled between them. Threads

produced in this way are said to be superior in strength and accuracy to cut threads.



Capacity of This Thread Roller Is 2-In. Diameter Bolts If Rolled Hot, and 1½-In. If Cold

On account of the massive size of this machine (it stands about 10 ft. high and weighs nearly 27 tons), it is generally advisable to locate it away from the main driving shaft and to drive it by individual motor inclosed in the machine base. Due to its height, the amount of headroom required for belt drive from overhead is considerably more than is usually available. A 40-hp. motor running at 1200 r.p.m. is recommended.

Bolts can be threaded on this machine up to 2-in. diameter, if rolled hot, and the corresponding maximum threaded length 4½ in. If rolled cold, the maximum diameter for ordinary carbon steel bolts is 1½ in. and the corresponding maximum threaded length 4½ in. If, however, the diameter is less than 1½ in., the threaded length can be greater, up to the maximum of 8 in. for a 1-in. diameter blank.

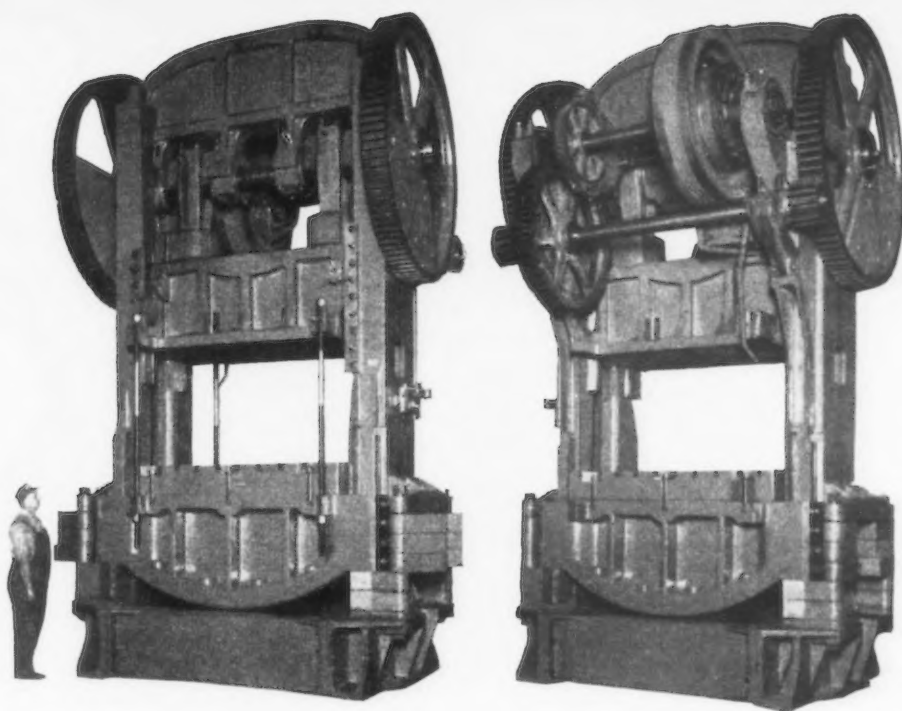
Work of the size produced on the No. 100 threader can best be fed by hand. An experienced operator should encounter no difficulty in maintaining a production of from 30 to 35 bolts a minute.

The flywheel is 41 in. in diameter and runs at 224 r.p.m. The machine is back-gearred 6.38 to 1. The floor space is 68 in. x 230 in., the height 118 in. and the weight 53,475 lb.

Car Dumper Loads Ship in 4 Hr., Total of 243 Cars

The New York Central Railroad (Ohio Central Lines) car dumper at Toledo established a new record on Aug. 24 in loading the steamer Thomas F. Cole of the Pittsburgh Steamship Co.

A total of 243 cars, containing 12,763 tons, was dumped into the boat in 4 hr. 12½ min. dumping time. This is at the rate of 57¾ cars per hr. from start to finish. The actual dumping time as given includes the time taken for shifting the boat. This dumper was manufactured by Heyl & Patterson and is completely electrified with General Electric motors and control.



Large Press with Adjustable Bed Which Is Set Through Main Drive

THREE improved details, which, it is stated, may be expected to influence future press production, feature the large double-crank press recently announced by the E. W. Bliss Co., Brooklyn, N. Y. These details are:

1.—An adjustable bed with supporting blocks and use of the main drive for setting the bed.

2.—A slide with a self-contained screw adjustment, a breaker safety device and "solid connections."

3.—A friction clutch drive without outboard wheels or brackets.

Arrangement of the machine may be seen from the front and rear views herewith. The bed is gibbed to the uprights and is supported on a system of blocks. It may be raised by connecting it to the slide through four long bolts in the open lugs at the corners. The main clutch is then used to move it. If the movement is to be upward, the shaft is turned to bottom center, the bolts evenly tightened, the gibs slacked and the shaft turned to top center thus raising the bed a distance equal to the stroke. As many blocks as will go are then swung in to support the bed temporarily, and the shaft is returned to bottom center for another lift. In the press shown, three such

lifts are necessary for the full movement. When the bed is at a height within one block's thickness of the desired position, the slide adjustment is used for the final setting.

Although this method of adjustment lacks some of the conveniences of the press with four motor-driven bed adjusting screws, the improved support afforded by this system, together with the entire absence of machinery in the foundation pit, will commend itself to the die setter and repair man. In shops where the bed adjustments are necessary only at rare intervals, this construction is said to offer also a price advantage as compared with the screw-adjusted bed.

In addition to the improved rigidity, the block supports are emphasized as offering a positive and non-wearing means of keeping the bed always level and parallel to the slide, while the screw-controlled machine may present difficulties in this respect which will increase with wear of the screws, nuts and gearing.

This press has one-piece, non-adjustable connections. Adjustment is made by a screw below the wrist. The wrist sockets have cylindrical exterior which is slidable in bored guides in the slide. The screws are extensions of the wrist socket and are fitted with long bronze nuts which are geared to an adjusting motor.

It is pointed out that these screws are relatively stronger than those of

the ordinary connection because they are true compression members and free from any bending forces. Locking is accomplished by a worm-shaft, at each end of the slide, which actuates a check nut. The check nut is so arranged that it brings the pressure areas of the screw and main nut firmly together.

The Safety Device

Under the main nut space is provided for the insertion of a safety washer which is calculated to break or shear under excessive loads. Its collapse relieves the slide about $\frac{1}{8}$ in., sufficient to prevent the damage to the press which may occur when a double or over thick piece is put in the dies. Replacement of the safety washer merely involves running the slide down till the end of the screw clears the washer, which may then be removed and a new one inserted through an opening in the upright.

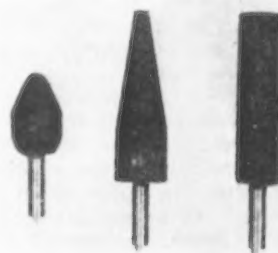
The Drive

The machine is driven by a motor on the crown, connected to the flywheel through a Texrope drive as shown. The short centers permissible with this drive make it feasible to put the flywheel inside the back brackets, resulting in a compact arrangement with an over-all width not exceeding the length of the crankshaft. The clutch is built into the flywheel; the brake is separated from the clutch. Both flywheel and shaft are mounted on Timken bearings. The driving shaft is short and needs but two bearings, instead of three as when the flywheel is mounted outside the frame.

Abrasive Points and Wheels for Portable Grinders

GRINDING wheels and mounted abrasive points for portable electric, pneumatic and flexible shaft grinders are being made available by the Carborundum Co., Niagara Falls, N. Y., in a wide variety of standardized shapes and sizes.

These wheels and abrasive points are made both in Carborundum brand Silicon Carbide and Aloxite brand Aluminum Oxide and in sizes and



shapes and range of grits and grades suitable for every grinding condition to which the portable tools are adaptable. Standard shapes can be modified to meet special conditions by means of the company's Carborundum dresser stick developed for dressing and forming such wheels.

New Automatic Spot Welder

NEW machines exhibited by the Thomson-Gibb Electric Welding Co., Bay City, Mich., at the National Metals Exposition in Chicago this week includes a No. 2 press welder regarded as an advance in automatic spot welder design.

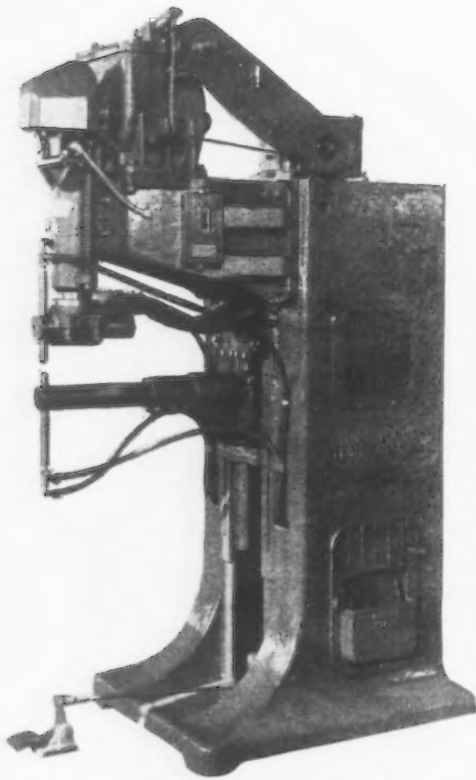
All semi-high-speed parts are inclosed, and the entire driving mechanism is on the top of the machine, reducing floor space requirements approximately 30 per cent. Ball and

mounted on Timken bearings. Five speed combinations are available. The slow-speed combination gives four speeds ranging from 15 to 30 spots per min., while with the fastest combination, four welding speeds, ranging from 60 to 130 spots per min. are obtainable.

The clutch, mounted with the worm reduction unit, is inclosed. It has nine engaging teeth and is positive and instantaneous in operation, and has no

backlash. The members of this clutch are hardened and ground. The worm reduction unit, clutch and change-gear box mechanism run in oil.

Using heavy springs, the machine can deliver pressures up to 2000 lb. A feature is the indicating pressure scale in the welding head which in recording pressure facilitates resetting. The remote control switch cam is now placed on the front end of the operating camshaft, which facilitates making adjustments. This cam, which controls duration of current dwell, is of fan type.



roller bearings assure minimum of friction, less maintenance and increased life.

The machine is built with six standard throat depths, ranging from 12 to 42 in. It is equipped either with a 60 or a 100 kva. water-cooled transformer, affording maximum welding capacity on the short-throat depth machine of two thicknesses of No. 10 gage material. The shorter throat-depth machines are efficient projection welders; they can make four projection welds at one stroke on No. 14 gage stock, the four projections being within a 4-in. radius.

The driving mechanism includes motor, a four-speed change-gear box and a worm reduction unit. From the motor the drive to the gear box is by spur gears, the motor pinion being of Micarta. From the gear box the drive is through silent chain and a worm reduction unit. The chain is covered by an aluminum guard and lubricated by a wick-feed oiler. When set at the slowest speed, the welding head makes only 15 spots per min., although the worm shaft speed is always between 835 and 1760 r.p.m. regardless of spots per min. The worm shaft is hardened and ground and

Direct-Action Magnetic Separator

A MAGNETIC separator in which material to be treated is exposed to the direct action of high-intensity magnets has been completed by the Magnetic Mfg. Co., Milwaukee, builder of Stearns high-duty magnetic separators. The unit makes possible the magnetic separation of highly reluctant magnetic material heretofore unresponsive.

While its principle of operation is relatively simple, this separator attains a high degree of efficiency. The material to be treated is passed through a specially designed hopper at the feeding end of a conveyor belt, which distributes it evenly over the belt.

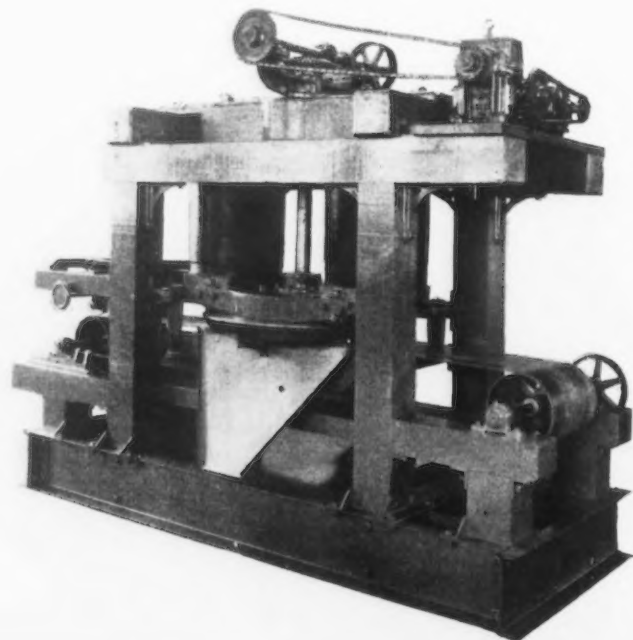
It then passes under a revolving, highly magnetized ring, which seizes all magnetically responsive material, moving it over and away from the non-magnetic material and discharging it on to chutes at the sides of the separator. The magnetic construction is such that the magnetized ring becomes neutralized as it passes over the discharge chutes, automatically releasing the magnetically separated material.

This separator provides for direct

magnetic action. The material to be treated comes into direct magnetic surface contact with the highly magnetized ring as it revolves over the conveyor belt. The air gap, which would tend to insulate against magnetic attraction, has been reduced to the minimum. This separator contains two electromagnets with 140,000 ampere-turns in the coil windings, able to exert a magnetic pull of high intensity.

The entire magnet assembly is an integral unit, which permits adjustments within the frame for varying magnetic intensities without causing internal strains and stresses in the frame. The magnetic ring is fitted to a government bronze disk, which is actuated by a shaft mounted on ball and roller bearings. The ring itself is tapered over its entire circumference, which intensifies its magnetic action. The magnet assembly, alone, weighs 12,000 lb.

A complete, self-contained unit, the separator includes motor and speed-reduction unit, and requires no accessory equipment for operation. Its capacity varies according to the materials to be processed.



Recovery Awaits Price and Wage Yielding

BY LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

FAVORABLE FACTORS

- 1.—Production curtailed and about 20 per cent below the long-term trend.
- 2.—Wholesale prices more stable at a low level.
- 3.—Production costs reduced, notably raw materials and labor.
- 4.—Much credit liquidation effected.
- 5.—Savings increasing.
- 6.—Bond market rising.
- 7.—Retail trade in fair volume.
- 8.—Light mercantile inventories.
- 9.—Strong financial position of many leading companies.

REAL progress has been made toward correcting maladjustments which have existed and the nation is beginning to work harder and to save, but the process of readjustment is still incomplete. Neither bank credit nor the enormous surplus stocks of basic commodities have been adequately liquidated.

Complete stabilization is hardly to be expected until the balance between supply and demand is restored by continued curtailment. The more positive and barometric factors are found on the unfavorable side—employment and payrolls, basic commodity prices, automobile production, building activity, unfilled steel orders, etc.

The way out of the present situation is to readjust prices and make them "right," so that goods can move. It seems probable that the beginning of sustained improvement will be seen next spring.

We start with (1) a worldwide "deflation" of credit. During the World War, and the speculative mania last year, credit was inflated. The necessary deflation has accompanied (and partly caused) a drop in basic commodity prices. Rubber, tin, sugar, silk, cotton, copper, zinc, wheat, etc., are very low.

This has caused (2) a reduction in our purchasing power. The farmers and miners who produce these basic commodities are hard hit. Also, many employees of companies manufacturing these things are out of work.

Because of this condition (3) retail prices have come to be out of line. They are in many cases too

UNFAVORABLE FACTORS

- 1.—Stocks of basic commodities large and still increasing.
- 2.—Commodity prices still weak.
- 3.—Purchasing power low, due to increased unemployment, drought, and low farm prices.
- 4.—Much frozen credit exists—large loans on stocks and bonds and real estate.
- 5.—Exports low; Canadian tariff.
- 6.—Bond market narrow, based on institutional buying of low-yield "legals."
- 7.—Unfilled steel orders off sharply at a critical time.
- 8.—Automobile industry extremely depressed.
- 9.—Building industry continues low; August permits and contracts reduced.

high—too high in comparison with wholesale prices, and too high for our pocketbooks.

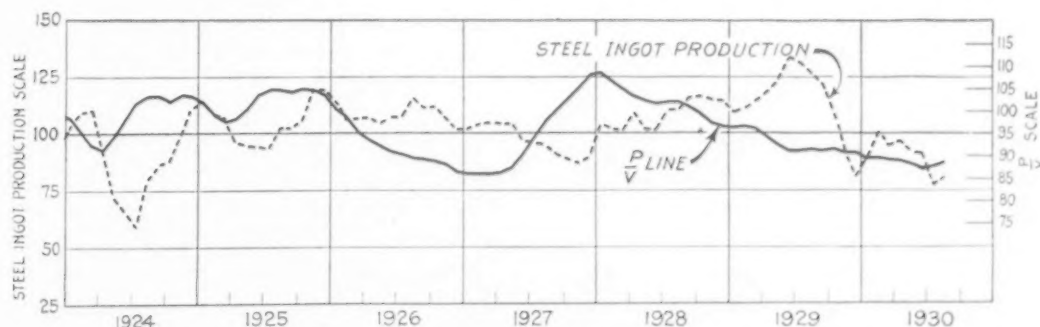
Then, too, in some cases (4) money wages have not come down in proportion to prices. Where the manufacturer or mining company cannot make any money at present low prices, he has to lay off men, unless he can get them at lower wages. *Money wages* should fit the cost of living. As living costs come down, men can work for somewhat lower wages.

So what we need to start the wheels turning and goods moving is (5) to complete these various price and wage-rate readjustments as quickly as possible.

When wholesale prices get low enough to move the excess supplies, and retail prices are adjusted to wholesale prices, we can all buy things again, and business will pick up. With a generally lower level of prices (and wage reductions, where necessary) we can have increased buying, increased production and increased employment.

To illustrate, suppose a manufacturer making a \$20 article pays \$10 for labor and \$8 for raw material and overhead, getting \$2 profit. If, now, he gets only \$15 for his product, he can pay \$7.50 for labor, and \$6 for raw material and overhead, leaving \$1.50 for profit. The percentages are all the same. Assuming the retail price to be reduced in proportion, everybody would be as well off.

With some such readjustment in prices, the mills can turn out as much cloth, shoes, lumber, automobiles, etc., as ever. There can be the same physical volume of business and employment as formerly.



THE P-V line might have been listed among the unfavorable factors. While, however, this barometer is below normal, it has turned upward and thus affords ground for hope that improvement will come some time within the next six months. Perhaps a little doubt exists as to the significance of the upturn, on account of some tendency to rise in the early fall months, owing to a seasonal factor in the Bradstreet price index. But unquestionably the curtailment of physical volume of trade has become so great, and many prices have been so reduced, that supply and demand in not a few cases must be nearing a stable adjustment at current price levels.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Overproduction and Depression

RICHARD WHITNEY, president of the New York Stock Exchange, in a recent address, undertook to exculpate the stock market crash of responsibility for the present business depression, declaring that the slump was brought on by a long period of overproduction accompanied by an artificially stimulated high price level for commodities.

The elapse of time brings a new perspective and it is now clear that overproduction was indeed one of the precursors of the stock market panic, but to single it out as the basic cause of business reaction is to give a secondary factor a major rôle.

By and large, the industrial situation that preceded the stock market debacle was not characterized by a pyramiding of orders and a piling up of commodity stocks. It is plain that too much was produced, but at the time of production—and this was particularly true of pig iron and finished steel—material was passing directly into consumption. In the last analysis, then, there was overproduction because there was overconsumption.

And this leads to what we still consider the basic cause of this overextension—the sustained credit inflation that supported the stock market boom. So long as securities, prices and call money rates were rising, the profits accruing therefrom acted as a sharp stimulant to commodity purchases. So long as income continued from this source there was no overconsumption or overproduction.

It is true that a large part of our population lived in a fool's paradise and it may be admitted also that general business began to taper a year ago in July, but it took the devastating stock market crash to bring everyone back to realities.

The contention that artificially maintained commodity prices were a contributory cause of the reaction lacks foundation, certainly so far as the iron and steel industry is concerned. Subsequent price reductions can be cited, of course, but they were forced by the sharp decline in business, not by the collapse of an inflated price structure.

There was no such mounting of iron and steel prices prior to the stock market crash as occurred in 1919 and 1920. Similarly price reaction has been much less severe than in the 1920-1921 depression. Finished steel, as measured by THE IRON AGE composite price is now 11.2 per cent lower than at its highest in 1929; pig iron is 9.8 per cent lower. In February, 1922, at the end of price deflation in the earlier depression, our pig iron composite had declined 62 per cent from its 1920 peak, and our finished steel composite 49.4 per cent.

Declining Automobile Production

AUTOMOBILE production in the first three months of this year presaged a total of 4,200,000 cars and trucks, United States and Canada, for the calendar year on the assumption that the remaining nine months would be in usual seasonal variation from the first quarter. The outlook now is for a total of about 3,600,000 instead, or 14 per cent less.

Predictions in the trade, however, had been the other way about, that there would be progressive recovery as the stock market collapse was left behind. The industry admitted that its production would be light in the early months of this year but insisted that some of the loss would be made up later. Here is a divergence from predictions that is worthy of some consideration.

Total production in the last six years, almost precisely 26,475,000, or about 4,400,000 a year, has been divided into the four quarters of the year as follows: 25.55 per cent, 30.24 per cent, 25.72 per cent, 18.49 per cent, and those figures may be taken as closely representative of average or normal seasonal variation.

Official reports showed this year 1,070,293 in first quarter and 1,259,940 in second quarter. July was reported at 272,551 and August showed 232,839. September may be forecast at 225,000 to bring the quarter out at a round figure, 730,000. Compared with average production in the same quarter of the last six years production has been as follows: First quarter, 94.9 per cent; second quarter, 94.4 per cent; third quarter, 65.2 per cent.

After allowance for seasonal variation, the second quarter just failed to maintain the first quarter pace, while the third quarter is failing by 32 per cent. There is, in other words, a progressive loss instead of the progressive recovery that had been predicted.

Admittedly there is room for argument as to what the fourth quarter will show, but it is not irrational to assume for purposes of comparison that it will be in usual seasonal relation to third quarter, which would give it 525,000. The calendar year total would then be 3,600,000, which is 36 per cent under 1929 and 14 per cent under the five-year average prior to 1929. The industry, however, had as bad a year in 1927 and almost as bad a year in 1924, and had nothing approaching 3,600,000 production prior to 1923. Thus in a way there is not such a great backset after all.

Last June it was stated that production was going to be very light in July, quite possibly also in August, and there were intimations that there was a definite policy, that opportunity was going to be afforded to dealers to liquidate their stocks of new and used cars.

Evidently that was not the point, for if demand had continued in usual seasonal proportion the large deficit in production in the last three months would have permitted the liquidation of any conceivable stock.

The only apparent explanation is that automobile buying, affected by the general business depression, is more and more affected as the depression continues. At the beginning of the year there was a certain amount of buying power left from the previous times of good employment and large dividends. That special buying power is dissipated and current automobile sales are in relation to buying power currently created.

Election Economics

WITH the beginning of the campaign for our fall elections, the usual political recriminations are being exchanged. The gas attack is now more pestiferous by the use of radio-telephony. The industrial depression is naturally a rich subject for oratory. Inasmuch as this prevails in most countries of Europe, the Orient and the Antipodes, and in Canada (whose economic conditions are quite like our own), it ought to be plain that neither of our political parties is responsible for it, nor was either of them the author of the previous prosperity.

Politicians may do good or bad things, but the economic consequences are seldom immediately evident. In assuming that they have their hand on the faucet from which flows prosperity or adversity, they take themselves too seriously. Anyway, there is not much use in talking economics to the voting masses; and still less when the talking is done by loquacious persons who have no better understanding than their auditors.

Keeping Our Minds on Work

IF one were to judge only by what is said and printed it would be clear that people are thinking altogether too much about the state of trade and the trade prospects, to the detriment of their own work. Probably the situation in this respect is not as bad as it seems, but there can be no doubt that we are thinking at least a little too much of these things. One test to be applied is this: Suppose you were told precisely, with an absolute guarantee, what the course of trade was going to be during the next three months, what would you do about it?

This matter of the course of trade is not as important as it is made to appear, because there are many people making a livelihood out of analysis and prediction. The individual business man has his field, with his own problems. Trade is in essence the sum total of what all business men do, but the individual position is the practical thing and much more important.

While we may not be actually getting neurotic over the trade situation and prospects, we certainly show signs of nervousness and that is always sure to interfere with work, as to both quantity and quality. It may be well to endeavor to get our bearings afresh and a helpful thing in that connection is to review certain times in the past, as to what people thought then and how things turned out.

In a history of trade the period 1893 to 1898 inclusive appears as a period of trade depression, as does that from 1873 to the latter part of 1879, and one beginning in 1857 and apparently stopped by the Civil War. The 1893-8 depression was not so severe as its predecessors, by any system of comparison, and it is really made to appear as a depression of that length by the particularly active times that followed.

The fact is that in 1897 and 1898 there were many men who did not know they were in a depression. They hoped for better times, of course, but practically their entire attention was devoted to working hard and efficiently. Successive new high records in pig iron production were made in 1897 and 1898 and the pig iron was all consumed.

Late in 1903 a depression began and repeatedly in the following year there were false starts toward greater activity. When this really did come a feeling of uneasiness developed and in the second quarter of 1905 a false start toward inactivity was made, an impressive item being a break in southern pig iron, but the force of the whole movement was such that it could not be stopped and there was really a three-year period of exceptional activity. There were mistakes made in calling the upturn too soon and then other mistakes in thinking it was not the real thing.

During the last five months of 1914 the one question most frequently asked by business men was: "How long do you think the war will last?" It seemed rash to suggest to anyone that he should try to make the best of it and not wait for the war to end. How short-sighted men were is emphasized by the fact that two years later the same question was asked, but in opposite mood, the point to be settled being whether a contemplated capital investment would have time to pay for itself, or at least its supposed extra cost.

It is true some men have succeeded by being able to call the turn sooner than other men, but those were big turns, while nowadays no one expects big turns, and there is too much publicity for anyone to be much ahead of other people. It might be added that those who did succeed by calling turns generally kept their views strictly to themselves.

Fiat Salaries

A CORRESPONDENT of a New York daily writes to it naively as follows:

According to the United States Census report, there are some 4,000,000 of clerical workers. Assuming that their salaries were increased, on the average, to the extent of \$2 a week, small enough the Lord knows, the result would be an increase of purchasing power of nearly \$500,000,000 per annum. It is hard to believe that this sum turned into the channels of trade would not have some effect upon business.

This implies the thought that employers who might increase salaries all around are holding something back and thus impairing purchasing power; and is blind to the logic that even if there were such a hold-back the employers themselves would be using the purchasing power, there being nothing else that they could do. Imagine the entire four million of

clerical workers to be employed by one corporation, the distribution of half a billion more to them would mean half a billion less to the stockholders. Imagine further that the four million clerical workers were themselves the stockholders.

It is difficult to convince the mass of people that income is derived only from production, for the products of which money is only a medium of exchange; and that there is not some supreme agency which manufactures currency that employers receive and allow reluctantly to filter through their hands, keeping for themselves as much of it as they can.

Need of Homes

FOR about 10,000,000 families in England there are only 8,000,000 houses, of which 6,000,000 are un-

satisfactory, according to the American consulate at Manchester, England.

Reliable estimates point out that 2,000,000 new houses are needed at once and that 6,000,000 could be utilized to replace those unsatisfactory. There would appear to be no good reason for the continuance of extensive unemployment in Great Britain. Likewise in the United States, the annual increase of 1,700,000 in the population, which the Census has reported for the last 10 years, indicates the need for 425,000 new houses (or apartments), but the actual building during recent years has been less than that. On the other hand the requirement for new houses is materially more than the increase in families, for old houses are constantly being lost by fire, obsolescence and demolition.

How to Make Industrial Conveyors Last Longer and Run More Cheaply

BY FREDERICK WEHLE*

SOME abuse of conveyors is due to buying them too light, through understating the daily tonnage or neglecting to consider irregularity in feeding. One hundred and fifty tons a day fails to state the case when a conveyor is to receive 30 tons an hour regularly for five hours, or where it has a ton of stuff dumped on it whole at 10 or 12-min. intervals. I have seen a 50-ton an hour coal crusher choked to a standstill by feeding it "carefully" (?) from a one-yard grab bucket. Low upkeep starts with a real study of capacity requirements present and future, before the conveyor is bought.

Hot, gritty, gummy, wet or corrosive materials are hard on conveyors. But, for practically every material industry has dared the conveyor people to tackle, a right kind of conveyor has gradually evolved. Compared with handling costs per ton of some materials on conveyors of early design, the unit cost with modern equipment is only a fraction. Elevators and conveyors for any material must be built with a full knowledge of the requirements. Suitability is a big step toward durability.

Conveyors correspond to trucks, in that fashion plays no part in their price. Greater durability, greater reliability and less upkeep expense are the valuable things paid for when one buys the more expensive materials-handling outfit.

Proper Engineering a Prime Factor

Seemingly expensive engineering usually means work by better engineers, and a good general design based on a real study of requirements. This is important, because there is often a question at first as to whether, for a specific installation, a continuous bucket elevator is better than a skip hoist, or whether the horizontal movement should be by drag or by apron, by belt, or by a screw conveyor. Or, whether vertical and horizontal may be combined by one of

several methods. Wise selection at this point makes a great difference.

Good engineering of the general layout will go further. It insures rigid and dependable supports to carry the machinery so it will stay in line, so it will be safe and accessible for painting, and for cleaning and oiling, all of which mean less ultimate cost and longer life. It means chutes that will not clog, clearances that are safe and paths of travel that are economical.

Good engineering extends to every detail of a conveying system, and is the least expensive thing about it. It includes selection of the right design, and the right size and the right material for every shaft, every bearing, chain and gear, and all idlers, sprockets, pulleys and other parts. For safety, dependability, long life and lowest power consumption, the best engineering means the most service for the least money.

Details of Equipment Important

Today there are roller-bearing belt conveyor idlers requiring less than half the power of old kinds, lasting much longer, and needing to be lubricated twice a year, compared with 365 times. There are sets of cut tooth alloy-steel gears operating silently in oil in compact, heavy, dustproof housings, with dustproof roller bearings for the shafts. There are chains of heat-treated alloy steel with case-hardened pins and bushings, which could not have been furnished at any price a few years ago, but which are turned out in quantity lots today, and carried in stock by the foremost chain manufacturers.

For duplicate conveyors used in identical service, the difference in life will naturally depend on the care in maintenance. This is an important thing to watch, because the maintenance some plants consider strict would be sniffed at by foremen in other plants. Making conveyors last longer is largely up to the man responsible for their selection.

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Demand for Steel Continues to Broaden Out

▲ ▲ ▲
INCREASE in Business Results in Firmer Steel Prices, But Pig Iron Breaks at Pittsburgh, as Well as at Birmingham for Northern Shipment
▼ ▼ ▼

IMPROVEMENT in iron and steel demand, although not rapid, is nevertheless sustained. Although much of the betterment is represented by future commitments rather than orders for current shipment, aggregate specifications are averaging close to 15 per cent higher than in August and for some steel sales offices are running ahead of the volume of a year ago, when business was on the decline.

The full extent of the gain in steel releases has been obscured by the tardy response of ingot output to expanding rolling mill schedules. Current steel ingot output, at 61 per cent, compares with 58 per cent in the two previous weeks. Earlier in the month, and probably also in August, raw steel production was a step ahead of finishing requirements. With this disparity removed, further increases in finished steel business should find quicker reflection in steel furnace operations.

The growing interest in forward buying has had the effect of stiffening finished steel prices. Efforts of buyers to cover their requirements through the first quarter or first half of next year have met with little success, since mills are disinclined to quote for delivery beyond Jan. 1. On fourth quarter business, as well orders for immediate shipment, producers are insisting on better prices than were recently current. This is particularly true of black and blue annealed sheets, on which price advances recently announced are becoming established market levels. Among the heavier rolled products, bars are showing greater strength, with 1.65c. a lb., Pittsburgh, representing an advance of \$1 a ton, more commonly quoted. In the East, structural shapes are up \$1 a ton to 1.70c. a lb., Bethlehem.

The gain in steel bookings has come largely without the aid of the automobile industry and the railroads, two of the largest consumers. Considerable business that had been deferred during the summer is now coming into the market. Indications are that consumers' stocks, in many cases, had been so badly depleted that replenishment was imperative. Now that replacement buying has become general and the tone of prices is improving, the incentive to hold stocks to the minimum is disappearing.

It is too early to estimate the actual gain in steel consumption. A number of miscellaneous lines, no doubt under seasonal stimulus, are more active, among

them the radio, stove and range, steel barrel and farm implement industries. The radiator business, which had been running 25 per cent behind the volume of 1929, has been only 15 per cent short of last year's record so far in September. This comparison is the more favorable, because sales a year ago were rising to the customary fall peak, October having been one of the best months on record.

Forward demand for pig iron continues to expand and, while it is doubtless prompted by the belief that prices are low, its initial effect has been to bring out further breaks in the market. In the Valleys, basic iron has declined \$1 a ton and other grades have dropped 50c. a ton, while at Ohio River points and other Northern consuming centers Southern iron, heretofore held at \$12, Birmingham, has receded to \$11.50. Scrap markets are irregular and lacking in trend, although weaker in their general tone than recently.

Automobile output continues to run behind the poor performance of August and two of the largest motor car makers have reduced their steel releases. One of them still has large commitments due on third quarter contracts which were held up because of reduced operations. The other's September steel specifications are the smallest in months. Nevertheless, a definite and unexpected upturn in retail orders has improved sentiment among motor car builders and this has apparently caused some of them to revise their schedules. As a consequence of a sudden increase in automotive specifications an important sheet plant operated at 100 per cent last week and may continue at that rate during the current week.

The fall rail buying movement, still slow in getting under way, is featured by the placing of 12,870 tons of rails and 4000 tons of track accessories by the Delaware & Hudson.

New fabricated steel projects, at 37,000 tons, are well above the weekly average to date, but awards, at 21,000 tons, are light. Computed bookings in August, as reported by the Department of Commerce, were 264,000 tons, compared with 280,000 tons in July.

Declines in pig iron at Pittsburgh and at Birmingham for Northern shipment bring THE IRON AGE composite price down to \$16.46 a gross ton, the lowest figure since late in 1915. An advance on black sheets of \$1 a ton raises the composite steel price from 2.142c. to 2.149c. a lb.

PITTSBURGH

Steel Business Continues to Gain—Pig Iron Prices Lower

PITTSBURGH, Sept. 23.—While reports of improved business in the steel industry have been more general in the last week than before, orders placed have not brought about any marked improvement in operations, particularly in steel-making departments. In some instances, finishing mill schedules are slightly higher this week, but the aggregate increase is certainly less than 5 per cent, with a slight falling off noticed in individual cases, particularly among tin mills.

Under the circumstances it might appear that recent improvement, commented on so widely by mills, is represented more in future commitments than in actual releases for immediate rolling. While such business would contribute materially to unfilled orders, the immediate benefit to steel companies would not be so marked.

In the meantime, consumer interest is unabated and buyers of steel generally seem to believe that the time is opportune for making future commitments. Steel producers in Pittsburgh and nearby districts are taking advantage of this disposition to strengthen prices, and the tendency to adhere to recent maximum figures has been definitely more pronounced in the last week. Several large mills are turning down orders for bars at less than 1.65c., Pittsburgh, while 1.60c. seems to be a well established minimum on plates and shapes. Sheet prices have also gained strength, and shading of hot-rolled strip is confined only to a few larger buyers in the Detroit territory. Offsetting this to some extent is the rather pronounced weakness in automobile body sheets, which are now freely available at 3.50c., Pittsburgh.

Reports of heavier specifications for a wide range of steel products in the last two or three weeks are well distributed among both the large and small producers. It is significant that this should come about without the aid of the automobile industry and the railroads, both of which are consistently limiting their releases.

Building steel is still being taken in good volume by structural fabricators and reinforcing bar distributors. Letting of bridge work for the Kentucky State Highway Department will add substantially to the order books of local fabricating shops. A local oil company is taking bids on six large barges, this being the first sizable inquiry in that line for several months.

Heavier releases are coming out from farm implement makers, while the stove and range industry is coming into the market in a substantial way for the first time since spring.

Moderately better steel buying not yet reflected in increased ingot output.

* * *

Strengthening of finished steel prices bringing in larger forward commitments.

* * *

Improvement in demand coming without material aid from automobile industry or railroads.

* * *

Pig iron prices lower. Quotations \$1 down on basic and 50c. on other grades.

* * *

Steel scrap prices unchanged, but further buying will be necessary to maintain present levels.

The steel ingot operating rate of the district remains substantially unchanged at 55 per cent of capacity. Some mills point out that lack of noticeable improvement is prompted by the fact that demand has only recently justified this rate and will have to continue some time longer before steel-making activity is advanced to meet it.

Valley basic pig iron has declined \$1 a ton, following quotations made by producers in that district to a Pittsburgh district consumer. Placing of the business with steel company interests, which may utilize water shipments, developed even lower figures when worked back to the Valley. Other grades of pig iron have declined 50c. a ton on the basis of small sales for immediate shipment.

Pig Iron

Sales of foundry, malleable and Bessemer iron at 50c. under the recent quoted market have established Valley quotations at lower levels, while basic iron has been offered at \$1 a ton under the recent market by a Valley producer. Other Valley interests quoted on the same business at price concessions and, while the iron was not placed with a Valley furnace, the offerings clearly established a lower market on this grade of iron. The business in question, representing a substantial inquiry by a Pittsburgh district steel company, is reported to have been placed with another steel maker which is able to utilize river shipments, and thus went at a price which figures back to a Valley base representing an even sharper break in the market.

In view of the fact that Valley producers withdrew from the competition

at around \$17, the price at which the business was placed is not figured to have influenced the quoted market further. Declines in the other grades of iron came about through small spot sales and represent no open break in the market. Shipments of iron this month are running slightly ahead of the corresponding July and August periods, and some new inquiry has come out. Nevertheless, consumers in this district have not been as quick to fall into a buying movement as has been the case in other districts, and hand-to-mouth buying is still the usual thing. The Shenango Furnace Co. has blown out its second stack, leaving the Pittsburgh and Valley districts with no strictly merchant furnaces in operation. Two or three steel companies are selling iron freely, and merchant interests generally have ample supplies of iron on their yards.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	18.00
Low phos., copper free....	\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel

The moderate improvement in finished steel releases in the last two weeks has not yet been reflected in demand for semi-finished steel, and shipments so far this month are not greatly in excess of the corresponding July and August periods. However, consumers are beginning to sound out the market, and additional buying is expected before the first of the month. Quotations on billets, slabs and sheet bars are holding nominally at \$31, while forging billets continue at \$36. On the latter product, fourth quarter contracting is proceeding with little delay. Shipments of wire rods are somewhat heavier, and future contracting is still rather dull. Producers are adhering to a \$36, Pittsburgh, quotation.

Rails and Track Supplies

Specifications are heavier this month than last, and are well diversified both in number of buyers and also from the standpoint of materials. Not much new inquiry has appeared, although a few roads are beginning to make known their fourth quarter requirements. The Chesapeake & Ohio

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Sept. 23, 1930	Sept. 16, 1930	Aug. 26, 1930	Sept. 24, 1929
	1930	1930	1930	1929
No. 2 fdy., Philadelphia.....	\$19.26	\$19.76	\$19.76	\$21.26
No. 2, Valley furnace.....	17.50	18.00	18.00	18.50
No. 2, Southern, Cin'ti.....	15.19	15.69	15.69	17.19
No. 2, Birmingham.....	14.00	14.00	14.00	14.50
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.....	18.75	18.75	18.75	19.75
Basic, Valley furnace.....	17.00	18.00	18.00	18.50
Valley Bessemer, del'd P'gh..	19.76	20.26	20.26	20.76
Malleable, Chicago*.....	17.50	17.50	17.50	20.00
Malleable, Valley.....	18.00	18.50	18.50	19.00
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	94.00	94.00	94.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh...	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.70	1.70	1.70	1.85
Finished Steel,				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.60	1.90
Bars, Chicago.....	1.70	1.70	1.75	2.05
Bars, Cleveland.....	1.65	1.65	1.70	1.95
Bars, New York.....	1.98	1.93	1.93	2.24
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.95
Tank plates, Chicago.....	1.70	1.70	1.75	2.05
Tank plates, New York.....	1.88	1.88	1.88	2.22½
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.90
Structural shapes, Chicago...	1.70	1.70	1.75	2.05
Structural shapes, New York.	1.85½	1.80½	1.80½	2.19½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh.	1.65	1.65	1.65	1.90
Cold-rolled strips, Pittsburgh.	2.35	2.35	2.35	2.75
Finished Steel,				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.45	2.40	2.40	2.85
Sheets, black, No. 24, Chicago	2.55	2.50	2.50	2.95
Sheets, galv., No. 24, P'gh...	3.00	3.00	3.00	3.50
Sheets, galv., No. 24, Chicago	3.10	3.10	3.15	3.60
dist. mill.....	2.05	2.05	2.05	2.35
Sheets, blue, No. 13, P'gh...	2.25	2.25	2.25	2.45
Sheets, blue, No. 13, Chicago	2.00	2.00	2.00	2.45
dist. mill.....	2.10	2.10	2.10	2.50
Wire nails, Pittsburgh.....	2.30	2.30	2.30	2.40
Wire nails, Chicago dist. mill.	2.35	2.35	2.35	2.45
Plain wire, Pittsburgh.....	2.70	2.70	2.80	3.20
Plain wire, Chicago dist. mill.	2.85	2.85	2.85	3.30
Barbed wire, galv., Pittsburgh	2.85	2.85	2.85	3.30
Barbed wire, galv., Chicago	2.85	2.85	2.85	3.30
dist. mill.....	\$5.25	\$5.25	\$5.25	\$5.35
Tin plate, 100 lb. box, P'gh..				
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh....	\$15.75	\$15.75	\$15.50	\$18.00
Heavy melting steel, Phila....	13.00	13.00	13.00	16.00
Heavy melting steel, Ch'go....	12.50	12.50	12.50	15.00
Carwheels, Chicago.....	13.50	13.50	13.50	14.00
Carwheels, Philadelphia.....	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh.....	13.50	13.50	13.50	15.50
No. 1 cast, Philadelphia.....	13.00	13.00	13.00	16.00
No. 1 cast, Ch'go (net ton)...	11.00	11.50	12.00	14.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net).	10.00	10.00	10.00	14.00
Coke, Connellsville,				
<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$2.65
Foundry coke, prompt.....	3.50	3.50	3.50	3.75
Metals,				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Lake copper, New York.....	10.50	10.87½	11.12½	18.12½
Electrolytic copper, refinery..	10.25	10.25	10.50	17.75
Tin (Straits), New York.....	29.75	29.87½	29.50	45.25
Zinc, East St. Louis.....	4.25	4.25	4.30	6.80
Zinc, New York.....	4.60	4.60	4.65	7.15
Lead, St. Louis.....	5.35	5.35	5.35	6.70
Lead, New York.....	5.50	5.50	5.50	6.90
Antimony (Asiatic), N. Y....	7.62½	7.75	7.75	8.62½

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

is taking bids this week on its tie plate and spike needs for the remainder of the year, while the New Haven has placed orders with a Pittsburgh mill for 2000 kegs of spikes.

Bars, Plates and Shapes

This market has shown rather distinct improvement in the last week or two, from the standpoint of both tonnage booked and price stability. Considerable business is coming into the market which has been delayed for the greater part of the summer, and new inquiry on the part of buyers is more noticeable than has been the case since last October. Structural tonnage in territory adjacent to Pittsburgh bulks rather large, and is being closed regularly. The American Bridge Co. is now bidder on a bridge across the Ohio River at Carrollton, Ky., calling for 4900 tons of shapes. The Gulf Refining Co. took bids this week on six barges requiring 1460 tons of plates. This is the first sizable barge inquiry which has come into the Pittsburgh market since last spring, and is thought to be the forerunner of a considerable buying movement. The shortage of river barges has been marked during the entire summer, and some estimates place the probable

needs of towing companies at as high as 150 units.

Producers have now generally opened their books for fourth quarter at 1.65c., Pittsburgh, for bars, and 1.60c. for plates and shapes. In some cases this represents an increase in the bar price, as the 1.60c. quotation, which became evident during August, was fairly widespread among larger users. In the last week or two this price has been pretty generally withdrawn, and larger makers are adhering to 1.65c. on the general run of orders. Naturally some contract business has been taken at 1.60c., but in all cases sellers have refused to extend such contracts past the first of next year, despite the efforts of buyers to secure such coverage. On plates and shapes the 1.60c. Pittsburgh quotation is fairly well sustained, except on especially attractive tonnages which are highly competitive.

Tubular Goods

Line pipe orders placed in the last week or two have gone to Valley producers, both of whom booked tonnage for their electric-weld and seamless mills. Pittsburgh companies report heavier specifications for standard pipe, which in many cases have come

from the jobbing trade. No appreciable increase in building operations has prompted this buying, but rather a desire on the part of distributors to replenish their stocks at an opportune time.

Wire Products

Merchant wire products have experienced better demand in the last week or two, and in most cases jobbers have insisted upon prompt delivery. The beginning of the month seems to have been a signal for distributors to place long deferred business, as their stocks had been allowed to reach minimum proportions. Nail prices are well maintained in this district at \$2, Pittsburgh, and deviations are not so common in outside territory. Manufacturers' wire is rather dull, but the price is well maintained at 2.30c., Pittsburgh.

Tin Plate

The tin plate industry is not yet feeling the usual seasonal lull expected at this time of the year, although operating schedules of some of the independents are rather light this week. The leading interest will also allow its production to fall off slightly, although rush shipments to the far

THE IRON AGE COMPOSITE PRICES

		Finished Steel	Pig Iron	Steel Scrap		
Sept. 23, 1930		2.149c. a Lb.	\$16.46 a Gross Ton	\$13.75 a Gross Ton		
One week ago		2.142c.	16.88	13.75		
One month ago		2.142c.	16.88	13.67		
One year ago		2.384c.	18.29	16.33		
		Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.		
		High	Low	High	Low	
1930.....	2.362c., Jan. 7	2.142c., Aug. 26	\$18.21, Jan. 7	\$16.88, Aug. 12	\$15.00, Feb. 18	\$13.08, July 1
1929.....	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928.....	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927.....	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926.....	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925.....	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

West are still taking considerable material. The average operating rate for the industry is estimated at somewhat under 70 per cent this week, a slight decline from that of the previous comparable period.

Strip Steel

Improved demand for strip steel has been sustained in the last week, and tonnage released during the month is still running 15 to 20 per cent ahead of the corresponding period in August. The automobile industry is contributing little, if anything, to this improvement and probably promises less for the rest of the year than any of the larger steel consuming groups. Demand for strip is well distributed throughout the other consuming channels, and that which is left to be desired in the size of orders is made up for by their volume. Prices also have a firmer tone. Cold-rolled strip is very well maintained at a minimum of 2.35c., Pittsburgh or Cleveland, and the smaller buyers are still paying 2.40c. and 2.45c. Deviations from the 1.65c. and 1.75c. quotations on hot-rolled strip have been reported from the Detroit district, but these are said to be enjoyed by a very few buyers, and the majority of the trade are now paying the full prices.

Sheets

While sheet specifications showed no further improvement last week, tonnage released compared favorably with that of the previous comparable period and several companies booked considerable forward tonnage. One maker commented particularly on the large number of comparatively smaller buyers who have placed fourth quarter business at the full quoted prices. The stove and range industry has again become a fairly active buyer after several months of very light requirements and farm implement makers are also showing more interest. Improved demand from steel barrel and drum makers continues, and manufacturers of metal lath are placing additional tonnage. Improvement in specifications has not been reflected as much as might be expected in the aggregate operating rate for the industry, although the present 50 to 55 per cent rate is some

10 points better than the lows reached during early August.

Prices continue to gain strength and minimum quotations announced a few weeks ago are rather well maintained on the common finishes of sheets. No deviations from the 3.10c., Pittsburgh, quotation on galvanized sheets are reported except in the case of large jobbers, and black sheets are apparently becoming stabilized at 2.45c. Jobbing mill light plates and blue annealed sheets are generally holding at 2c. and 2.15c., although scarcely any of the material being shipped currently carries those figures. Despite the lack of demand for automobile body sheets, the price is exceedingly weak and the market is now quotable at 3.50c. to 3.60c., with little tonnage in evidence at the higher figure. Steel furniture material is also quotable at a range of 3.60c. to 3.70c. Considerable confusion has arisen over the recent change in deep drawing extras. Users who were able to work on material requiring only the regular extra are now paying an advance of \$2 a ton, while a substantial reduction is afforded those requiring extra deep drawing.

Cold-Finished Steel Bars

Makers report a general, if limited, improvement in specifications, and buyers are finally beginning to place their fourth quarter contracts, which had been delayed because of price uncertainty. A few larger users are reported to have covered for the remainder of the year at price concessions and others are still holding out. Nevertheless, mills are adhering to 2.10c., Pittsburgh, with considerable regularity.

Coal and Coke

Business in domestic coke continues to show improvement, although a number of dealers are now well stocked and any further increase in business will have to wait for colder weather. Furnace coke is rather quiet, but one large operator has added a few ovens in the Connellsville region and others are expected to follow. The price is well maintained at \$2.60 to \$2.65, Connellsville. Foundry coke is quiet, although shipments are reported to be somewhat heavier with

some makers. The coal market is still very discouraging, and slack is particularly dull. Prices are low and seem to be declining rather than improving.

Old Material

The scrap market has been particularly dull in the last week, the only activity having been purchases by dealers to cover old contracts. If anything, the situation is slightly easier, with some material available at \$15.25 to \$15.50. The latter figure is still being paid for first grade material, and quotations on No. 1 heavy melting steel are nominally unchanged from last week. The other grades are also quieter, with no transactions reported which might change the price structure. Unless further buying develops in the next week, a decline in prices would not be unexpected. The Pennsylvania Railroad list, containing 34,000 tons, closes on Oct. 1.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

No. 1 heavy melting steel...	\$15.50 to \$16.00
No. 2 heavy melting steel...	13.00 to 13.50
Scrap rails	15.00 to 15.50
Compressed sheet steel...	15.00 to 15.50
Bundled sheets, sides and ends	12.50 to 13.00
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary...	15.50 to 16.00
Heavy breakable cast.....	11.00 to 11.50
No. 2 railroad wrought....	15.50 to 16.00
Hvy. steel axle turnings...	12.50 to 13.00
Machine shop turnings....	8.00 to 8.50

Acid Open-Hearth Grades:

Railr. knuckles and couplers	17.50 to 18.00
Railr. coil and leaf springs	17.50 to 18.00
Rolled steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 21.00
Low phos. mill plates.....	17.00 to 17.50
Low phos. light grades...	17.00 to 17.50
Low phos. sheet bar crops	18.00 to 18.50
Heavy steel axle turnings..	12.50 to 13.00

Electric Furnace Grades:

Low phos. punchings.....	17.00 to 17.50
Heavy steel axle turnings..	12.50 to 13.00

Blast Furnace Grades:

Short shovelling steel turnings	8.75 to 9.25
Short mixed borings and turnings	8.75 to 9.25
Cast iron borings	8.75 to 9.25

Rolling Mill Grades:

Steel car axles	21.50 to 22.50
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Cupola Grades:

No. 1 cast	13.00 to 14.00
Rails 3 ft. and under.....	16.50 to 17.00

CHICAGO

Increase in Steel Inquiries, Some for First Quarter —Operations Up Slightly

CHICAGO, Sept. 23.—Probably one of the most encouraging signs that has come to the local steel market in many weeks is a rather sharp upturn in inquiries. While most of the requests for prices are for deliveries ranging from one to three months, some tonnage is being sought for the first quarter of next year.

It might be argued that producers' efforts to stabilize prices is the stimulant back of these inquiries were it not for the fact that sales this week show moderate gains, while specifications definitely point to expanding consumption by many diversified industries. This is especially true of bars, which are more active now than at any time since late last spring.

Ingot operations have gained one point to an average of 58 per cent for the district, while blast furnace operations remain stationary with 16 steel mill stacks blowing.

Further efforts are being made to bolster the price structure on finished steel products. Although plates, shapes and bars are still quotable at 1.70c. to 1.75c. a lb., Chicago, at least one producer is attempting to raise prices to the higher figure. September probably will register only a slight gain in steel use. However, sellers believe that further gains will be made in October. Agricultural implement manufacturers are now entering specifications for steel needed for October production schedules, and new releases for sheets have raised production at least five points in the last week.

Plates

This commodity still remains the most active of the heavy tonnage mill products. Schedules for pipe manufacture at Milwaukee are arranged for a number of weeks ahead and it is expected that additional releases will soon be forthcoming, so that shipments of plates for this purpose will be in good volume throughout most of the remainder of the year.

There is still a note of uncertainty regarding the course of the tank market. Close to 20,000 tons of plates is on inquiry from oil producers in Oklahoma. Reports received here indicate that the purchase of this tonnage hangs on a legal decision, expected Sept. 27, which will determine whether or not curtailment of production will remain in effect. If unrestricted well flow is permitted again, then additional tankage will be a necessity. An order for 600 tons of tankage plates has been placed with a Western mill, and the Freeman Mfg. Co., Racine, Wis., is expected to buy 600 tons of plates and shapes for a water tank and tower which it will erect for the city of Racine.

Railroad car building shops are operating on greatly reduced schedules

Expanding steel inquiries, some for first quarter of 1931, accompanied by larger sales for early delivery.

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Specifications indicate larger current consumption by many diversified industries.

* * *

Ingot operations gain one point to an average of 58 per cent for the district.

* * *

Efforts to strengthen steel prices continue.

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Pig iron shipments are 15 per cent above those of same period in August.

and therefore give little support to local plate mills. This in itself would not be of so great moment but for the fact that there is not so much as a whisper concerning car programs that may be considered between now and the first of the year. Most sizes of plates may be had on short notice and prices are steady at 1.70c. to 1.75c. a lb., Chicago.

Pig Iron

Shipments of Northern pig iron continue to hold a lead of 15 per cent above the rate in August, and releases are growing slowly, with the promise that October will show additional gains. This market remains steady at \$17.50 a ton, local furnace. New sales are in good volume in view of the number and size of transactions in recent weeks, when some buyers made commitments well into 1931. Deliveries are running slightly above output of the four merchant furnaces in blast. Southern iron is off 50c. to \$11.50 for the base grade, f.o.b. Birmingham. The charcoal iron and silvery markets are quiet.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	18.00
Malleable, not over 2.25 sil.....	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50.....	27.04
S'th'n No. 2 fdy.....	17.51
Low phos., sil. 1 to 2, copper free..	23.50
Silvery, sil. 8 per cent.....	26.79
Bess. ferrosilicon, 14-15 per cent...	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Structural Material

Improvement in this market is slow, but the indications are that the future, probably soon after the turn of the year, holds some promise of better things. Each day sees progress made on the plans for the first section of

the Chicago subway. As plans now stand about 3½ miles of tube will be the first undertaking. While details of designs have not been given out, fabricators expect that much structural steel will be used and the tonnage may run as high as 7000 tons a mile. A preliminary step toward subway construction will be the rebuilding of the State Street bridge, which will call for about 5000 tons of steel. Approaches to the outer bridge are now under construction, and civic bodies are urging the rebuilding of the old Harrison Street bridge. Mills estimate that building work now contemplated for Chicago will take close to 50,000 tons of steel. Most of this, however, is not in immediate prospect.

A disturbing factor in this market is an apparent change in the class and size of work which many shops are now seeing fit to bid on. The net effect is that more bids are being entered, because of the greater number of shops seeking a wider range of work. Large fabricators are now interested in small tonnages and some small fabricators are reaching for some of the larger tonnages. Structural shapes are being quoted at 1.70c. to 1.75c. a lb., Chicago.

Bars

Demand for bars, after giving indication of betterment a week ago, now gives further proof that consumption is growing at rather a satisfactory rate. New orders for mild steel bars show decided improvement this week, and interest in future needs is evidenced by brisk inquiry and a few contracts. In the meantime specifications are also growing heavier. Releases are now being entered by the farm implement group, which has arranged its program for October manufacture. There is also improvement in the use of bars by automobile parts makers. Frequent roll changes are affording nearby deliveries on mild steel bars, prices for which are holding at 1.70c. to 1.75c. a lb., Chicago. The iron bar market is quiet.

Use of alloy steel bars is growing slowly and Western mill operations have gained in the past week. The tone of the rail steel mill bar market continues to improve, as reflected in larger output and more of an inclination by buyers to enter commitments for the remainder of the year. Prices remain steady at 1.65c. a lb., Chicago district mill.

Rails and Truck Supplies

This market remains quiet while sellers await inquiries for rails. It is reported that the track accessories needed by the Chesapeake & Ohio will be ordered this week, and the purchase of rails by the Pere Marquette ap-

pears near at hand. Miscellaneous bookings in standard-section rails are making little impression on order books, which are very light. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Reinforcing Bars

General conditions have changed little in the past week. The price situation is still tangled and promises to remain so under conditions which dictate low shop output. Awards for reinforcing bars for road and bridge work in Illinois account for more than 1000 tons in new business. Contractors are spreading the tonnages in small lots and in many directions so that individual awards do not attract wide attention. Orders for bars for the 16-story Eddystone apartments are still pending, but it is evident that purchases are near at hand for the reason that a contract for placing the necessary piling has been let.

Wire Products

Incoming orders are holding at the average rate of the past few weeks and wire mill operations are steady. The bulk of new orders are for close-by needs, and only a few consumers have so far been willing to make commitments for the remainder of the year. Merchant trade products, which registered a gain in demand a week ago, are still moving in good volume and the prospect is that this tonnage will be relatively steady in coming weeks. Prices for common wire nails in and near Chicago are \$2.10 to \$2.15 per 100-lb. keg and wire to the manufacturing trade is moving in small lots at 2.35c. a lb., Chicago.

Cold-Rolled Strips

Demand, after causing operations to be stepped up to a 30 per cent rate, has shown no additional gains in the last few days. Prices, at 2.35c. a lb., Cleveland, lack firmness.

Hot-Rolled Strips

Specifications are measurably larger, with more tonnage moving to parts and automobile manufacturers. Mill output has been increased slightly to meet buyers' additional needs.

Warehouse Business

Orders continue to gain slowly and warehousemen are of the opinion that the corner has been turned and that coming weeks will show heavier movement from stocks. Prices are steady except on light sheets.

Cast Iron Pipe

Fresh inquiries and lettings this week are in encouraging volume. Of 130,000 ft. of 8-in. pipe inquired for by Detroit, about 77,000 ft. has been placed at prices that are said to have been about \$35 a ton, Birmingham. Successful bidders on the business placed at Detroit were Central Foundry Co. and Lynchburg Foundry Co.

Among fresh inquiries are 1000 tons of 16-in. Class C pipe for Milwaukee; 5000 ft. of 8-in., 15,000 ft. of 6-in., a small quantity of 4-in. and 33 hydrants for Williams Bay, Wis., and 7000 ft. of 6-in. and 6000 ft. of 8-in. Class C pipe for a waterworks and sewage system for Woodruff, Wis.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43 to \$45; 4-in., \$46 to \$48; Class A and gas pipe, \$3 extra.

Sheets

New business remains spotty, though in the aggregate it is heavier than a week ago, and accordingly hot mill output has been raised to 60 per cent of capacity. Most orders are for prompt delivery and mill books lack the strength given by future commitments. Warehouse distribution of sheets shows improvement this week.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann'l'd, 2.15c. *Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.*

Coke

Shipments of by-product foundry coke continue to make gains in accordance with the moderate increase in the melt in local foundries. The price is stable at \$8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets

Releases, some of which are from manufacturers of farm equipment, are larger, and producers foresee heavier output soon after the turn of October. Production now ranges from 45 to 50 per cent of capacity. Fourth quarter contracts have been entered from nearly all users.

Old Material

Use of scrap is making headway, as shown by sellers' billings, which are

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars	2.90c.
Reinforc'g bars, billet steel—	
Less than 5 tons.....	2.85c.
5 tons to 30 tons.....	2.45c.
30 tons to 200 tons.....	2.00c.
200 tons and over.....	1.85c.
Rail steel reinforcement—	
Less than 5 tons.....	2.50c.
5 tons to 30 tons.....	2.10c.
30 tons and over.....	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands (¾ in. in Nos. 10 and 12 gages)	3.10c.
Hoops (No. 14 gage and lighter) ..	3.65c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.35c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes (¾ in. and larger).....	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
Per Cent Off List	
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach or lag screws.....	60 and 10
Hot-pressed nuts, sq., tap. or blank, 60 and 10	
Hot-pressed nuts, hex., tap. or blank, 60 and 10	
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg.....	\$2.30 to 2.55
Cement c't'd nails, base per keg	2.30 to 2.55

running about 20 per cent heavier than in August. Steel mill releases of heavy melting steel are larger, in spite of the large tonnages which they are holding in their yards. Another encouraging development is the fact that inquiries are gaining in number and several unsolicited orders have been placed on brokers' books. It is significant, however, that users are still holding to the practice of placing orders only for immediate shipment. Incoming tonnages of most grades, borings being an exception, show no tendency to grow, and technically the price structure is in position to advance with any marked increase in buying.

Prices deliv'd Chicago district consumers: Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraulic compressed sheets	10.25 to 10.75
Drop forge flashings.....	8.60 to 9.00
No. 1 bushelling.....	9.50 to 10.00
Forg'd cast and r'l'd steel carwheels	15.00 to 15.50
Railroad tires, charg. box size	15.50 to 16.00
Railroad leaf springs cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.50 to 14.00
Coil springs	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings	11.25 to 11.75
Low phos. punchings	13.00 to 13.50
Low phos. plates, 12 in. and under	13.00 to 13.50
Blast Furnace Grades:	
Axle turnings	8.00 to 8.50
Cast iron borings.....	6.75 to 7.25
Short shoveling turnings..	7.25 to 7.75
Machine shop turnings....	5.50 to 6.00
Rolling Mill Grades:	
Iron rails	13.00 to 13.50
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails, less than 3 ft..	14.00 to 14.50
Steel rails, less than 2 ft..	14.75 to 15.25
Angle bars, steel	13.50 to 14.00
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.50 to 14.00
Agricultural	12.50 to 12.75
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars.	12.00 to 12.50
Iron arch bars and transoms	13.00 to 13.50
Iron car axles	21.50 to 22.00
Steel car axles	15.00 to 15.50
No. 1 railroad wrought....	9.75 to 10.25
No. 2 railroad wrought....	11.00 to 11.50
No. 1 bushelling	7.50 to 8.00
No. 2 bushelling	6.00 to 6.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast....	11.00 to 11.50
No. 1 railroad cast.....	10.00 to 10.50
No. 1 agricultural cast....	9.50 to 10.00
Stove plate	8.50 to 9.00
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Effective Oct. 1 the general office and main sales office, exclusive of sales of special drop forgings, of J. H. Williams & Co., Buffalo, will be consolidated with company's Eastern sales office and warehouse at 75 Spring Street, New York. The service department will be retained at Buffalo.

CLEVELAND

Steel Business Shows Moderate Increase— Operations Higher at 50 Per Cent

CLEVELAND, Sept. 23.—The volume of steel business is showing a slight gain from week to week. Two large producers whose combined products cover most forms of finished steel report a gain of over 15 per cent in tonnage so far this month over the corresponding period of August. Aside from an improvement in alloy steel bars and a slight gain in carbon steel bars from the automotive industry, the increase is coming almost wholly from industries outside of the automotive field. Sheets in particular show quite a gain from industries other than automotive.

Motor car manufacturers are reducing their steel inventories to the bone and are buying only what they need for immediate requirements. However, some of the automobile manufacturers are still trying to contact for forgings and other parts for their indefinite requirements through the first quarter or first half of next year. Mills are showing no willingness to make commitments beyond the last quarter.

Steel plant operations in Cleveland were increased this week by the starting up of one additional open-hearth furnace. The local mills now are operating at 50 per cent of ingot capacity. A Youngstown producer put on two additional open-hearth furnaces and increased sheet mill operations. The Pere Marquette rails are still pending. The Chesapeake & Ohio has an inquiry out for 16,000 tie plates, 5300 kegs of track bolts and 7500 kegs of track spikes. While a few contracts for steel bars, plates and shapes have been taken for the fourth quarter at present prices, few consumers are showing interest in contracts.

Pig Iron

Some foundries are showing less disposition than recently to follow a hand-to-mouth buying policy and, as a result, orders on an average are for larger tonnages than they have been. Sales of foundry and malleable iron by Cleveland interests during the week aggregated about 11,000 tons, or about the same as during recent weeks. Some inquiry has come out for the first quarter, against which furnaces have not yet quoted prices. Shipments showed quite a gain this month over August. Increase is due largely to better orders from manufacturers of heating equipment and some other lines and jobbing foundries. Gain in shipping orders from the motor car industry is slight. Shipments by a leading producer are more than 20 per cent greater so far this month than during the corresponding period in August. Prices are holding steady at the recent range. Foundry iron is being quoted as low

as \$16.50 by some Lake furnaces for shipment to competitive points, although the usual range is \$16.75 to \$17. In Michigan, the price is holding at \$18. For Cleveland delivery, local furnaces quote \$17.50, furnace.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.	\$17.50
S'th'n fdy., sil. 1.75 to 2.25.	\$17.51 to 18.01
Malleable	17.50
Ohio silvery, 8 per cent....	25.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley...	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

Sheets

Orders show a moderate improvement from scattered sources outside of the automotive field. Much of the tonnage is in car lots. Some good business was placed by barrel manufacturers during the week and a slight pick-up in orders from a stove industry is reported. The local Fisher body plant has advanced shipping schedule one week for sheets for Chevrolet bodies. Not much interest is being taken in fourth quarter contracts and there has been little test of prices that have been advanced for that delivery. On automobile body sheets 3.60c., Pittsburgh, has virtually disappeared, but some of the mills that are taking business through the fourth quarter at 3.50c. announce that they will not keep that price open after this week. The black sheet market has a firmer tone, some business having been taken at 2.45c., although the 2.35c. price has not disappeared. While jobbing mills are getting 2c. for No. 10 blue annealed and 2.15c. for No. 13, continuous mill products are going at as much as \$4 a ton lower. Irregularities prevail in sheet differentials.

Strip Steel

While some of the mills report a slight gain in the demand for hot-rolled strip, orders are still light. As no fourth quarter contracts are reported, 1.65c. for wide strip and 1.75c. for narrow have not been tested for that delivery and larger consumers are still able to buy at \$1 a ton lower. Cold-rolled strip remains inactive, with a price spread of 2.35c. to 2.45c., Cleveland. These prices have also been named for the fourth quarter.

Semi-Finished Steel

The present \$31, Cleveland and Youngstown, price for sheet bars, billets and slabs is being named for the fourth quarter by the local producer, but consumers are showing no interest in making contracts. Specifications are holding to recent volume.

Bolts and Nuts

The present bolt and nut price of 73 per cent discount has been reaffirmed for the fourth quarter. Stove bolt prices also have been reaffirmed.

Bars, Plates and Shapes

Demand for the heavier rolled steel products shows a slight further gain. Orders average larger lots than recently. Little inquiry is coming out for structural steel for building work. An Ohio tank shop has taken evaporators and towers for the Pure Oil Co., Toledo, requiring 1400 tons of steel. This company is also about to place eight large tanks requiring 1650 tons of plates. The present 2.65c. price on alloy steel bars has been reaffirmed for the fourth quarter. The Cleveland base on steel bars is unchanged at 1.65c. for local delivery and 1.60c. to 1.65c., Cleveland, for outside shipment. Structural shapes are firmer, shading from 1.60c., Pittsburgh, on round lots evidently having disappeared. Plates are firm at 1.60c., Pittsburgh.

Wire Products

Wire business has been stimulated somewhat by orders for material for making mesh for road work. Shading on nails to \$1.95 a keg was reported at some points. Manufacturers' wire is firm.

Old Material

A Cleveland mill that has taken no scrap for several weeks is now accepting shipments of blast furnace material. One Youngstown district mill has cut down shipments somewhat. There is no new demand by mills and very little activity among dealers. Prices are lower on both steel-making and blast furnace grades. The market has a weak tone.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel...	\$11.75 to \$12.25
No. 2 heavy melting steel...	11.25 to 11.50
Compressed sheet steel...	12.00 to 12.25
Light bundled sheet stampings	9.00 to 9.25
Drop forge flashings.....	10.00 to 10.50
Machine shop turnings...	7.00 to 7.50
Short shoveling turnings...	8.00 to 8.50
No. 1 railroad wrought...	13.00 to 13.50
No. 2 railroad wrought...	14.00 to 14.50
No. 1 busheling.....	11.75 to 12.00
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops...	17.75 to 18.00
Low phos., billet bloom and slab crops.....	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap...	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings.....	8.00 to 8.50
Mixed borings and short turnings	8.00 to 8.50
No. 2 busheling.....	7.50 to 8.00
Cupola Grades:	
No. 1 cast.....	14.00 to 14.50
Railroad grate bars.....	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	18.50 to 19.50
Miscellaneous:	
Rails for rolling.....	16.25 to 16.50
Railroad malleable	15.00 to 15.50

NEW YORK

Pig Iron Demand Continues to Increase— Steel Prices Firmer

NEW YORK, Sept. 23.—Pig iron demand continues to broaden out. Sales for the week total 9000 tons, including 2500 tons for the Eastern Malleable Iron Co., Naugatuck, Conn. The Thatcher Co., Newark, N. J., is inquiring for 3000 tons of No. 2 plain for the rest of the year with the privilege of extending deliveries into the first quarter. This iron is for its Garwood, N. J., plant, but under the terms of the inquiry the company will have the option of specifying for 200 tons of No. 2X for delivery at Newark. The A. P. Smith Mfg. Co., East Orange, N. J., is in the market for 375 tons of No. 2 plain and No. 2X, representing additional fourth quarter requirements. The American Locomotive Co. is asking for prices on 150 tons of high silicon iron for Schenectady, N. Y.

Pending inquiry is estimated at 15,000 to 20,000 tons, a considerable part of the total being iron that will be bought by New York purchasing offices for delivery outside of this district. Among large lots wanted for other districts are 2000 tons for first quarter shipment and 5000 tons for delivery during the first half of 1931.

Competition in this district has been accentuated by a reduction of 50c. a ton to \$11.50, Birmingham, in the price of Alabama iron for Northern shipment.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91
*Buff. No. 2, del'd east. N. J.	19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	\$18.89 to 19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	18.89 to 19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars

Public projects continue to account for a large part of current business. The Concrete Steel Co. will supply 750 tons for the New Jersey approach to the Fort Lee bridge and Igoe Brothers will furnish 250 tons for the Avenue Z sewer in Brooklyn. The general contract has been placed for additional road work in Bergen County, calling for 1400 tons. Leading distributors will quote revised prices effective Oct. 1: For mill shipment, 1.70c. a lb., Pittsburgh, on building and paving work, and 1.80c. on subway work (rail steel will be offered at \$4 a ton less); for delivery from local stock, 2.35c. a lb., New York, up to 3.05c. a lb. for lots of less than 2 tons. On warehouse deliveries to outlying zones differentials will be charged to cover the extra cost of trucking.

Cast Iron Pipe

The usual seasonal buying of bell and spigot pipe, which develops with the approach of fall, has been limited thus far to scattered carload lots and an occasional large tonnage. In addition to about 14,000 tons of 48-in. pipe for the Federal Water Service Co., bids have been opened on about 12,000 tons of 42-in. pipe by Wilmington, Del., for an installation at the Old Mill Stream force main. About 13,000 tons of 8 to 24-in. pipe, recently in the market for export to the Dutch East Indies, is reported to have been placed with a European maker.

Prices per net ton deliv'd New York:
Water pipe, 6-in. and larger, \$38.90 to \$39.90; 4-in. and 5-in., \$41.90 to \$42.90; 3-in., \$48.90 to \$49.90. Class A and gas pipe, \$3 extra.

Finished Steel

Efforts of steel companies to stiffen prices are meeting with some success. Against a recent open market price of 1.65c. a lb., Bethlehem, on structural shapes, 1.70c. is now declared to be the minimum even for large fabricated projects. Miscellaneous users of shapes, including some good buyers, also have been quoted 1.70c., equivalent to 1.85½c., delivered New York. Steel bars are stronger, being generally quoted in this market at 1.65c., Pittsburgh. Sales have been quite numerous at this figure, and only special buyers such as car companies and bolt and nut makers, it is said, have been able to cover at less, either on prompt or forward business. Not much sheet buying has developed since the

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'd sheets (No. 10)	3.25c. to 3.40c.
Black sheets (No. 24*)	3.65c. to 3.90c.
Galvanized sheets (No. 24*)	4.25c.
Long terme sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2 ½ x ¾ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	.65
1 x 30 in. and smaller	.65
Carriage bolts, cut thread:	
¾ x 6 in. and smaller	.65
¾ x 20 in. and smaller	.65
Boller Tubes:	Per 100 Ft.
Lap welded, 2-in.	\$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

new minimum prices were announced early in the month, but consumers who did not cover prior to the advance have been obliged to pay the new figures, which represent an advance of \$2 a ton over their previous purchases, especially on black and blue annealed sheets. Black sheets are quoted at 2.45c., Pittsburgh, and that figure is now being used also as the base price for high-finished sheets. In line with the strengthening of structural steel prices, fabricators are quoting from \$3 to \$5 a ton higher on new building projects.

The Delaware & Hudson Railroad has ordered 12,870 tons of rails from the Bethlehem Steel Co., also about 4000 tons of track accessories.

Coke

Foundry coke specifications reflect no material change in the rate of melt. Prices remain the same, furnace coke ranging from \$2.50 to \$2.60 a net ton, Connellsville, while foundry coke quotations are as follows:

Special brands of beehive foundry coke, \$4.70 to \$4.85 a net ton, ovens, or \$3.41 to \$3.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.29 to \$9.44 to New York and Brooklyn; by-product foundry coke, \$9 to \$9.40, Newark or Jersey City; \$10.06, New York or Brooklyn.

Old Material

While scrap prices have not developed a definite downward trend, the market seems to lack the firmness evident a week ago. A consumer of heavy breakable cast scrap at Florence, N. J., following a purchase at \$12.50 a ton, delivered, is only offering \$12.25 a ton. Stove plate for local foundries is slightly lower on the basis of recent purchases.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$9.00 to \$10.50
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast	8.00 to 9.00
Stove plate (steel works)	6.00 to 6.25
Locomotive grate bars	6.00 to 6.50
Machine shop turnings	5.00 to 5.25
Short shoveling turnings	5.00 to 5.50
Cast borings (blast fur. or steel works)	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Steel car axles	17.00 to 17.50
Iron car axles	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire	7.50
No. 1 railroad wrought	9.75
No. 1 yard wrought, long	8.75
Rails for rolling	9.50 to 10.00
Stove plate (foundry)	7.00
Malleable cast (railroad)	10.50 to 11.00
Cast borings (chemical)	8.50 to 9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.50

Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has appointed the Mine & Smelter Supply Co., Salt Lake City, Utah, as agents.

PHILADELPHIA

Steel Mill Operations Unchanged— Inquiry Shows Slight Improvement

PHILADELPHIA, Sept. 23.—Pressure by steel consumers for lower prices has relaxed, and mills are showing more firmness in maintaining quotations than has been evident for some months. Concessions still appear occasionally, but these are attributed largely to the fact that protections at the former low levels have not been withdrawn. Inquiry for steel is slightly improved, most of the increase coming from manufacturers of products and equipment used in building construction. Actual business on mill books, however, continues at about the same level as in recent months, and rolling mill operations in eastern Pennsylvania are unchanged at about 50 per cent of capacity, excepting Bethlehem, whose rate is higher. In certain cases where mills have reduced their ingot stocks to a minimum, open-hearth operation has been slightly increased, but is generally at a lower average than the rolling departments. One mill has added a furnace.

Radio manufacturers in the Philadelphia district are continuing to step up their production schedules, so that one maker is producing about 5000 sets a day and two other large manufacturers are making 3500 to 4000 a day. Certain stove manufacturers and sheet metal contractors on roofing are more actively inquiring for sheets.

Steel Bars

Although soft steel bars are quoted at 1.65c. a lb., Pittsburgh, or 1.94c., delivered Philadelphia, a substantial tonnage of present business is being done at 1.60c., Pittsburgh, or 1.89c., Philadelphia. Except for an occasional contract of size, reinforced concrete projects are small. About 800 tons of reinforcing bars for cattle pens in West Philadelphia for the Pennsylvania Railroad has been placed with the Turner Construction Co., the bars to be furnished by a Pittsburgh mill. Quotations on billet steel bars range from 1.75c. to 1.85c., Pittsburgh, or 2.04c. to 2.14c., delivered Philadelphia. Rail steel bars are at 1.55c. to 1.65c., Franklin, Pa., or 1.84c. to 1.94c., delivered Philadelphia.

Pig Iron

Foundry iron is generally quoted at \$18.50 a ton, furnace, by eastern Pennsylvania producers, with occasional concessions of 25c. to 50c. a ton, when competition is encountered from Southern sellers, who have reduced their quotations to \$11.50 a ton, Birmingham. A Northern furnace has sold a sizable tonnage of foundry iron to a Delaware River pipe shop, which will aid the seller to reduce a substantial stock of iron on the furnace yard. The Virginia furnace continues in blast, but as Virginia cast iron pipe makers are limiting purchases, iron is

accumulating at the furnace. The Newport News Shipbuilding & Dry Dock Co. is buying carload lots of foundry and malleable iron from the Virginia furnace and in eastern Pennsylvania. The Baltimore & Ohio Railroad is inquiring for about 100 tons of low silicon, high manganese, foundry iron and 50 tons of No. 1X grade. Some foundry iron inquiry for first quarter and first half of next year has appeared, including 2000 tons from one consumer and 5000 from another.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$19.26 to \$19.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.76 to 20.26
East. Pa. No. 1X.	20.26 to 20.76
Basic (del'd east. Pa.)	18.25 to 18.50
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Shapes

A substantial total of present buying is at 1.70c. a lb., f.o.b. nearest mill to consumer, or 1.76c., delivered Philadelphia, but concessions of \$1 a ton are occasionally granted on new business, caused in part by sellers meeting protections at lower prices, which have not been withdrawn. Although the volume of new construction in this district has not increased, fabricators are beginning to quote higher prices, based on the stronger position of shapes.

Plates

Buying has not increased in tonnage, although orders are being booked from a wider range of customers than for some months and there is a good volume of new inquiry. Some interest has been shown by certain consumers in contracting for the fourth quarter at the present price of 1.70c. a lb., Coatesville, Pa., or 1.80½c., Philadelphia. While this

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to ¼-in. inclus.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

quotation is being maintained by eastern Pennsylvania mills on new business, a substantial tonnage of business placed on mill books is at slight concessions from this level, caused by protections which have not been withdrawn.

Sheets

Local consumers of sheets are operating at slightly better rates in some cases, especially radio manufacturers and producers of products entering into building construction. While blue annealed and black sheet prices are fairly well maintained, galvanized are shaded about \$1 a ton from the expected minimum market of 3.10c., Pittsburgh, or 3.39c., Philadelphia, and occasional sales have been made to jobbers at 3c., Pittsburgh, or 3.29c., Philadelphia. Black sheets continue at 2.45c., Pittsburgh, or 2.74c., delivered Philadelphia, and blue annealed sheets are 2.15c., Pittsburgh, or 2.44c., Philadelphia, for No. 13 gage, with blue annealed plates, No. 10 gage, at 2c., Pittsburgh, or 2.29c., Philadelphia.

Imports

In the week ended Sept. 20, 1003 tons of pig iron arrived at this port from British India. Steel imports consisted of 32 tons of structural shapes and ¼ ton of hoop steel from Belgium.

Old Material

Sentiment in the scrap trade lacks some of the strength manifested in recent weeks, although recent sales have not established any downward trend in prices. Holders of scrap are still inclined to refrain from selling at present prices, evidently expecting advances, and brokers filling contracts with eastern Pennsylvania mills are not finding a surplus available at the present levels.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
No. 2 heavy melting steel.	\$10.50 to 11.00
Heavy melting steel (yard)	10.00
No. 1 railroad wrought.	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.75 to 9.00
Heavy breakable cast (for steel works)	11.50 to 12.50
Railroad grate bars.	10.00
Stove plate (for steel works)	10.00
No. 1 low phos., hvy.	20.00
0.04% and under.	17.50 to 18.00
Couplers and knuckles.	17.50 to 18.00
Rolled steel wheels.	17.50 to 18.00
No. 1 blast f'nace scrap.	8.00 to 8.50
Wrot iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire.	11.50 to 12.00
Cast iron carwheels.	15.00
No. 1 cast.	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling.	13.50 to 14.00

BIRMINGHAM Some Improvement in Steel Orders— Three Blast Furnaces Put Out

BIRMINGHAM, Sept. 23.—Books for fourth quarter pig iron were opened on Sept. 17, at \$14 base, Birmingham, the price that has applied on district sales during the third quarter. The extremely quiet condition of the market is reflected in the fact that only a few small sales have been made for October delivery. Inquiries are lighter than at any comparable period in years. Shipments are still averaging a little better than the August rate, though a decline in specifications has been noted in the past two or three days.

The Tennessee company has only two of its 10 blast furnaces in operation. This company banked three furnaces at Ensley last week, when the rail mill was shut down, these being Nos. 3, 4 and 6. The No. 1 furnace, the only one left in operation at Ensley, has been changed from basic to foundry iron. The Fairfield No. 5 furnace, banked since Aug. 16, is expected to be placed in operation this week. Active furnaces in the district total 10, of which eight are on foundry iron and two on basic.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$14.00
No. 1 fdy., 2.25 to 2.75 sil.....	14.50
Basic	14.00

Cast Iron Pipe

Inquiries have increased and pressure pipe manufacturers report more tonnage in prospect than in a number of weeks. Municipalities in the South and West are largely responsible for this improved showing. District plants have bids in on 3100 tons at Detroit and 2000 tons for which bids have been opened at Los Angeles, Cal. Bids are being submitted on 2100 tons to be awarded by Long Beach, Cal., on Sept. 23. Lebanon, Tenn., will take bids about Nov. 1, on 6½ miles of cast iron water mains, and Memphis, Tenn., will soon be in the market for an important tonnage. Hazlehurst, Miss., will open bids Oct. 7, for 5264 ft. of 4-in. pipe. Morgan City, La., has postponed awards indefinitely on 10,200 ft. of 10 and 6-in. pipe. West Monroe, La., has awarded 8000 ft. of 10-in. and 6000 ft. of 6-in. to the McWane Cast Iron Pipe Co. and 1100 ft. of 8-in. pipe to the Central Foundry Co. The United States Pipe & Foundry Co. has received contracts for about 800 tons for Macon, Ga., and 200 tons for Greenville, Ala.

Coke

The Tennessee company is operating 267 of 497 ovens, a reduction of 75 ovens in the past week. Active ovens in the district total 971 of 1390. Demand shows a little seasonal improvement, but the movement of coke is still considerably below normal. The price remains at \$5 a net ton, Birmingham.

Finished Steel

Slight but steady improvement in demand for plate, bars, shapes and wire products this month has developed a better volume of sales than was shown in August, each of the past three weeks having shown a perceptible increase. More inquiries were reported last week than for some time. Quotations are unchanged except on black sheets, which show only the former minimum figure of 2.65c. The rail mill at Ensley was shut down Sept. 18, pending receipt of further orders. Other finishing mill operations of the district are without change. With the suspension of the rail mill, the four remaining active open-hearths at Ensley were taken off. At Fairfield the open-hearths have been increased from four to five. The Gulf States Steel Co. continues to operate three at Alabama City.

Last week structural steel fabricators booked their first important orders of the month. New orders of the Virginia Bridge & Iron Co. include 750 tons for the Bienville Street wharf at New Orleans, 400 tons for Fairfield strip mill of the Tennessee company, and the company is low bidder on 1000 tons for a highway bridge

at Tyner, Tenn. The Nashville Bridge Co. has booked 940 tons for a State highway bridge at Augusta, Ga., and 175 tons for the Air Corps Tactical School at Montgomery, Ala. Reinforcing bar manufacturers report a little improvement in demand, only small tonnages being involved.

Old Material

A large order for cast scrap to be delivered during the fourth quarter brought an adjustment in prices, the first in the past two or three months. Quotations on stove plate have been reduced from \$11.50 to \$10; No. 1 cast from \$13 to \$11.50; tramcar wheels from \$12.50 to \$11.50, and cast iron carwheels from \$13 to \$12. Prices on steel axles have been raised \$1 a ton to \$21 and quotations on rails for rolling are off \$1 a ton at \$13.50. Dealers report demand, offerings and shipments of steel scrap to be quieter than in August.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.00
Scrap steel rails.....	\$12.50 to 13.00
Short shoveling turnings..	9.00
Cast iron borings.....	9.00
Stove plate	10.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought... 10.00 to	10.50
Rails for rolling.....	13.50
No. 1 cast.....	11.50
Tramcar wheels	11.50
Cast iron carwheels.....	12.00
Cast iron borings, chem....	13.50

CINCINNATI Sharp Gain in Sheet Orders—Southern Iron Off 50c.

CINCINNATI, Sept. 23.—A slight increase in the total sales of pig iron has resulted in a more optimistic feeling among district furnace representatives. Buyers, however, are still limiting purchases to their immediate needs and are not showing any disposition to anticipate their requirements. In fact, the trade is without any sizable inquiry at this time. The melt continues to be low, with district foundries operating three to four days a week on relative-

ly small heats. Total sales last week were approximately 2525 tons, of which about 1000 tons was Southern iron. A central Indiana buyer took 500 tons of Southern iron and a central Ohio consumer bought 250 tons. The 500-ton order brought out a price of about \$11.50, base, Birmingham, and is the lowest figure yet quoted on Southern iron in this district. The other sales were at \$12 to \$12.50, base, Birmingham.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$20.89 to \$21.39
Ala. fdy., sil. 1.75 to 2.25..	15.19 to 16.19
Ala. fdy., sil. 2.25 to 2.75..	15.69 to 16.69
Tenn. fdy., sil. 1.75 to 2.25.	15.19 to 16.19
S'th'n Ohio silvery, 8 per cent	24.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material

The return of a number of automobile manufacturers to the sheet market has brought a marked increase in the tonnage of local sheet mills. In fact, the leading independent reports that operations at its Middletown unit were 100 per cent of capacity last week, and that the schedules for this week call for 400 tons more than the largest schedule in the history of the company. Consequently, this unit reports a small backlog at this period. Average operations for all units of this interest have been

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reforc. bars.....	3.15c.
Rail steel reforc. bars.....	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex.....	3.80c.
Squares	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	4.20c.
Small rivets .....	.60 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in..	\$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in....	17.50
4-in.	36.00

increasing for the last four weeks as tonnage demand grows. Indications are that a definite uptrend has begun and, should the current rate of demand continue, it is anticipated that bookings during the remainder of the year will be at twice the rate of the first six months. The depletion of inventories of automobile manufacturers has forced them into the market in order to sustain their operations. Orders, however, do not anticipate their requirements for more than 30 days. A slight improvement has also been noticed in the demand from the electrical refrigeration and radio fields.

Coke

A very slight improvement has been noted in the movement of foundry grades of coke during the past week. New business, however, is small.

BOSTON Weakness Again Crops Out in Scrap Market—Pig Iron Sales Off

BOSTON, Sept. 23.—Pig iron sales the past week fell short of 1800 tons, compared with 3000 tons the previous week. The Mystic Iron Works and Buffalo furnaces took most of the business. The Universal Winding Co., Providence, R. I., which asked for prices on 1100 tons of No. 2X and No. 1X iron, actually bought 400 tons of Buffalo iron, and the Eastern Malleable Iron Co., Naugatuck, Conn., in the market for 2500 tons of malleable, has covered. Buffalo No. 1X iron, heretofore steady at \$16.50 a ton, on cars furnace, was sold the past week at \$16, but a majority of furnaces are holding to the former quotation.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25..	\$20.28
†Buffalo, sil. 2.25 to 2.75..	\$20.28 to 20.78
*Buffalo, sil. 1.75 to 2.25..	20.91
*Buffalo, sil. 2.25 to 2.75..	20.91 to 21.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	22.61
*Ala., sil. 2.25 to 2.75.....	23.11
†Ala., sil. 1.75 to 2.25.....	18.75
†Ala., sil. 2.25 to 2.75.....	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Bars

Business is confined to scattered small tonnages, with the aggregate for the week under 300 tons. Some half dozen Massachusetts jobs calling for about 1500 tons apparently are no nearer closing than they were a fortnight ago. New prospects include 135 tons for a Waltham, Mass., hospital, and 225 tons for a Massachusetts bridge. Despite the sluggishness of business, prices for billet steel bars are holding as follows: One to 5 ton lots, 3.15c. a lb., base, from stock; 6 to 99-ton lots, 2.65c.; 100-ton lots

Old Material

The scrap iron market is quiet and featureless. New business is scarce and most of the district mills have suspended shipments on contracts. Prices continue at recent schedules, although there has been no definite test.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.25 to \$11.75
Scrap rails for melting....	12.00 to 12.50
Loose sheet clippings.....	7.00 to 7.50
Bundled sheets.....	9.50 to 10.00
Cast iron borings.....	6.50 to 7.00
Machine shop turnings....	6.00 to 6.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires....	13.25 to 13.75
No. 2 railroad wrought....	11.25 to 11.75
Short rails.....	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	12.50 to 13.00
Burnt cast.....	7.00 to 7.50
Stove plate.....	7.00 to 7.50
Brake shoes.....	7.00 to 7.50
Agricultural malleable....	12.50 to 13.00
Railroad malleable.....	13.50 to 14.00

and larger, 2.55c. Rail steel bars are 2.26½c. a lb., delivered Boston freight rate points.

Cast Iron Pipe

Although by no means active, the market is more so than it was a week ago owing to the sounding out of prices by several municipalities and public utility companies. The Warren Foundry & Pipe Co. sold 300 tons privately to two users, and R. D. Wood & Co. were the low bidder on 115 tons of 18-in. pipe required by Onset, Mass. Worcester, Mass., reported as in the market for more than 4000 tons of pipe, bought 36 in. lock joint pipe from the Lock Joint Pipe Co., Ampere, N. J., cast iron pipe

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.365c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tire steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	3.50c. to 5.55c.
Squares and flats....	4.00c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts.....	60 and 5
Carriage bolts.....	60 and 5
Lag screws.....	60 and 5
Hot-pressed nuts.....	60 and 5
Cold-punched nuts.....	60 and 5
Stove bolts.....	70 and 10

foundries not being given an opportunity to submit bids. Concord, N. H., is in the market for 8000 ft. of 12-in. pipe.

Class B pipe prices remain at \$35 to \$37 a ton, on cars foundry. A \$3 differential is asked on Class A and gas pipe.

Structural Steel

Bids went in today on 1200 tons of steel required for a State bridge at Tyngsboro, Mass., the only sizable tonnage that developed the past week. Aside from bridge work, the market is quieter than it has been in several months, current figuring by fabricators being mostly on small jobs, the largest of which calls for 70 tons for a Needham, Mass., police and fire station. Fabricators report that architects and engineers have little business in prospect.

Old Material

Weakness has again cropped up in prices. The best price offered for No. 1 heavy melting steel today is \$9.25 a ton, on cars shipping point, contrasted with \$9.50 a week ago. Some brokers have dropped below \$4 a ton for steel turnings, and steel mill borings also are lower. Shafting for New England consumption is \$13 to \$13.25 a ton, on cars, but for Pennsylvania runs up to \$14 on a few old contracts. Specification pipe has dropped 25c. to 35c. a ton, while the holding up of chemical borings shipments has resulted in a 50c. a ton drop. Forge scrap, forge flashings and long bundled skeleton prices appear to hold up better than those for other materials, presumably because offerings are light and brokers still have some old orders. The Maine Central Railroad on Sept. 20 closed bids on 400 tons of No. 1 and 1280 tons of miscellaneous rails, as well as on a few smaller items, but has made no awards.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$9.00 to \$9.25
Scrap T rails.....	8.50 to 9.00
Scrap girder rails.....	7.50 to 8.25
No. 1 railroad wrought....	8.00 to 8.50
Machine shop turnings....	3.75 to 4.10
Cast iron borings (steel works and rolling mill)	3.50 to 4.00
Bundled skeleton, long....	6.10 to 6.50
Forge flashings.....	7.25 to 7.75
Blast furnace borings and turnings.....	3.10 to 3.50
Forge scrap.....	6.10 to 6.50
Shafting.....	13.00 to 14.00
Steel car axles.....	16.50 to 17.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.25
Rails for rolling.....	10.00 to 10.25
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$11.00 to \$11.50
No. 1 machinery cast....	13.50 to 14.00
No. 2 machinery cast....	11.50 to 12.00
Stove plate.....	8.00
Railroad malleable.....	14.00 to 14.50

Gears & Forgings, Inc., has concentrated heavy gear and special machinery production at its Ford City, Pa., plant, merging the Ford City and Pittsburgh plants.

PACIFIC COAST

SAN FRANCISCO, Sept. 20 (*By Air Mail*).—Activity in the Pacific Coast iron and steel markets is by no means pronounced. New inquiries are slow in coming forth. Reinforcing bars and cast iron pipe were the most active items in the week. Important awards included 2000 tons of plates for a pipe line at Anacortes, Wash., booked by the Puget Sound Machinery Depot, and 1577 tons of cast iron pipe for Los Angeles, allotted to several concerns. Prices are holding fairly well.

Bars

A number of projects involving over 100 tons of reinforcing steel were awarded, the total exceeding 1800 tons. Among the larger lots were 500 tons for the Procter & Gamble Co. plant at Long Beach, 200 tons for a pier extension for the Navy operating base in San Diego, 260 tons for an addition to the Rose Bowl, Pasadena, and 200 tons for an apartment building on Cherokee Street, Los Angeles. Bids were opened on 301 tons for a bridge over the Los Angeles River at Atlantic Street, Los Angeles. New inquiries call for 400 tons for a jail in Los Angeles, bids on which will be opened on Oct. 8. Prices on out-of-stock material both in the San Francisco and Los Angeles districts continues firm at 2.50c., base, on carload lots.

Plates

Awards of plates aggregated 2100 tons. In addition to the 2000 tons for the Anacortes pipe line, mentioned above, 100 tons for tanks for the Vancouver Creosoting Co. at Vancouver, B. C., was let to the Vulcan Iron Works. Bids have been opened on a 55,000-bbl. tank for the Navy operating base at San Diego, calling for 260 tons of material. Prices remain unchanged at 2.15c. to 2.25c., c.i.f.

Shapes

The majority of structural awards involved lots of less than 100 tons. The Pacific Coast Steel Corp. will furnish 165 tons of sheet piling for the Honolulu Oil Co., San Francisco. A bridge at Bellingham, Wash., involving 100 tons, was placed with the Pacific Car & Foundry Co. The Western Bridge Co. booked 125 tons for a bridge at Colebrook, B. C., for the Great Northern Railroad. Bids have been opened on 560 tons for a bridge over the Los Angeles River

Cast Iron Pipe Business Gains— 2000 Tons of Plates Awarded

Pig iron prices per gross ton at San Francisco:

*Utah basic	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

at Atlantic Avenue, Los Angeles. New inquiries include 100 tons for an apartment house in San Francisco. Shapes continue to range from 2.15c. to 2.25c., c.i.f.

Cast Iron Pipe

Awards of cast iron pipe were the largest in over three months,

having totaled more than 2600 tons. Phoenix, Ariz., placed 172 tons of 6 and 12-in. Class B pipe with an unnamed interest. F. B. Gridley secured 436 tons of 16-in. Class B pipe for Beverly Hills, Cal. San Diego placed 301 tons of 4 to 8-in. Class C pipe with the R. E. Hazard Contracting Co. Unnamed interests took 188 tons of 16-in. Classes B and C pipe for Seattle. Los Angeles awarded 637 tons of 12-in. Class 150 pipe to the American Cast Iron Pipe Co., 32 tons of the same size to the United States Pipe & Foundry Co., 545 tons of 8-in. Class 150 to the Pacific States Cast Iron Pipe Co. and 363 tons of the same size pipe to the National Cast Iron Pipe Co. The only new inquiry of importance calls for 3008 tons of 16 to 24-in. Class 150 pipe for Los Angeles, bids on which will be opened Sept. 23.

YOUNGSTOWN

Steel Specifications Show Gain of 10 to 15 Per Cent This Month

YOUNGSTOWN, Sept. 22.—Aggregate specifications for steel products coming to Valley producers this month continue to average 10 to 15 per cent higher than they did in August. This has resulted in somewhat higher finishing mill operations at some points, although steel ingot output has not risen above the 50 per cent rate which has prevailed for several weeks. In fact, production of basic materials has declined further so far this month, with the blowing out of two steel company blast furnaces and the prospective banking of a merchant iron stack.

Valley mills have quietly opened their books for fourth quarter contracting and are making such commitments as have come to them without extensive solicitation. In a market like this steel company sales departments are naturally far more interested in tonnage releases than in forward contracting, particularly when consumers seek a price advantage on future shipments. A number of buyers have sought to cover their needs for the first half of 1931 at current prices, but in all cases mills have refused to quote beyond the first of the year.

However, the interest in forward buying has stimulated the market and determined mills to take a firmer stand on prices. In some cases fair-sized orders for sheets and strips at price concessions under the quoted market are being refused and are not always placed elsewhere. Independent companies have taken a fair amount of sheet tonnage for fourth quarter shipment at 2.45c., Pittsburgh, for black sheets, 3c. and 3.10c. for galvanized, 2c. for light plates, and 2.15c. for blue annealed sheets. On all of these products, except possibly blue annealed sheets, certain larger buyers have been able to cover their needs for the remainder of the year

at lower figures, and, even though the higher prices become established on current orders in the last quarter, aggregate shipments during that period will not likely show much of an increase in average billing prices. Cold-rolled strip is well maintained at 2.35c., Pittsburgh, and on hot-rolled strip producers generally consider the market 1.65c. and 1.75c. Minimum quotations to preferred buyers are \$1 a ton less, but buyers who have been able to get this concession are nearly always so favored. Plates are well maintained at 1.60c., and strenuous efforts are being made to hold bars at 1.65c., Pittsburgh. This figure represents the price to smaller buyers, although a 1.60c. quotation must still be considered as a factor in the market. Nails are holding at 2c. to 2.05c., with little contract business at either figure. Semi-finished contracts for the fourth quarter are being extended with no change in the \$31, Youngstown, quotation.

The new electric welded pipe capacity in the Youngstown district is now being operated at approximate capacity. Within the last few days the Youngstown Sheet & Tube Co. has booked an order for 25,000 tons of 12-in. seamless material from the Sinclair Consolidated Oil Co. This follows a previous order for 35,000 tons from another buyer, which is constituting the initial commercial production of the company's new electric welding mill. The Republic company has also announced an additional order for 110 miles of electric-welded pipe, and will be able to run its new mills at capacity for at least 10 weeks. This pipe activity has resulted in increased operations of plate mills at both Youngstown and Brier Hill. Demand for butt-weld pipe is very light, although operations are well maintained on the larger sizes of lap-weld material.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.40c.
Black sheets (No. 24).....	4.35c.
Blue ann'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.00c.
Struc. rivets, 1/2-in. and larger.....	5.00c.
Com. wire nails, base per keg.....	\$3.35
Cement c't'd nails, 100 lb. keg.....	3.35

ST. LOUIS

Improvement in Pig Iron and Steel, with Prices of Latter Stiffening

ST. LOUIS, Sept. 23.—Things are looking up in the pig iron market. The first sizable order for some time—2000 tons of foundry iron for a northern Illinois melter for fourth quarter delivery—was placed this week with the St. Louis Gas & Coke Corp. Inquiries for both Northern and Southern iron are increasing, with a gain in the melt. With prospects for further improvement, there is generally a better feeling both among the makers and melters than has prevailed for some time. Melter are more interested in their fourth quarter requirements than they have been, and some business is expected to develop within the next few weeks. The St. Louis Gas & Coke Corp. is maintaining a price of \$17.50, f.o.b. Granite City, for both foundry and malleable grades. The price for Southern iron is \$12 to \$12.50.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill...	\$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	\$15.92 to 16.42
Northern malleable, deliv'd	19.16 to 19.66
Northern basic, deliv'd	19.16 to 19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel

A stiffening of prices of plates, shapes and bars and sheets is reported, with an increase in the number of inquiries and sales, although buying from mills was not so heavy as in the preceding week. Warehouse business, which began to show an upturn the beginning of September, continues to improve, and the first three weeks of the month are from 10 to 12 per cent ahead of the same period a year ago, and factors here are encouraged in the hope that further gains will be made. The only structural award of the week went to the Mississippi Valley Structural Steel Co., 500 tons for the Globe-Democrat building.

Old Material

Sales of heavy melting steel to one East Side consumer and specialties to another were made during the week,

and a few items were slightly higher as a result. Specialties and rails are especially strong and 25c. a ton higher, and railroad springs are 50c. higher because of light offerings. Cast iron is extremely dull, and there is only a light movement of relaying rails. Receipts generally are light, and there is very little distress material. Railroad lists: Atchison, Topeka & Santa Fe, 4225 tons; Chicago, Burlington & Quincy, 4005 tons; Chicago, Indianapolis & Louisville, 35 carloads; Nashville, Chattanooga & St. Louis, nine carloads, and St. Louis-Southwestern, seven carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	\$11.50 to \$12.00
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No. 1 heavy melting or shoveling steel	11.50
No. 2 heavy melting or shoveling steel	10.25 to 10.50
No. 1 locomotive tires	13.25 to 13.75
Misc. stand-sec. rails including frogs, switches and guards, cut apart	13.00 to 13.50
Railroad springs	14.50 to 15.00
Bundled sheets	7.00 to 7.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 bushelling	8.00 to 8.50
Cast iron borings and shoveling turnings	6.00 to 6.50
Iron rails	10.00 to 11.00
Rails for rolling	13.50 to 14.00
Machine shop turnings	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Steel car axles	16.50 to 17.00
Iron car axles	21.00 to 21.50
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	14.50 to 15.00
Steel angle bars	12.50 to 13.00
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	11.00 to 11.50
Railroad malleable	11.50 to 12.00
No. 1 railroad cast	11.00 to 11.50
Stove plate	9.00 to 9.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	10.00 to 10.50

BUFFALO Pig Iron Inquiries at 12,000 Tons Show Large Increase—Steel Operations Gain

BUFFALO, Sept. 23.—A sharp increase in inquiries for pig iron has developed. The aggregate that came into the market in the past week was 12,000 tons, against recent weekly totals of 2000 to 3000 tons. There are several inquiries from foundries for 1000 to 1500 tons. An Eastern melter is in the market for 1000 tons of malleable iron. One of the week's orders was for 2000 tons of foundry iron. Some of the inquiries cover deliveries in the first quarter. There are also some calling for shipment by canal barge before the close of navigation. Total bookings in the week were about 8000 tons. For shipment to competitive points in the East, Buffalo furnaces continue to quote \$16, Buffalo, for No. 2 and No. 2X.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.25

Finished Steel

A slight increase in the operations of the Lackawanna plant of the Bethlehem Steel Co. is the only change noted in the mill situation. This plant has increased its output by the capacity of two furnaces, going from 11 to 13. The Donner plant of the Republic Steel Corp. continues to operate four open-hearths; the Wickwire-Spencer Steel Corp., three, and the Gould Coupler Co., one of five. The Seneca Iron & Steel Co. continues to operate at 50 per cent.

Old Material

No increase in activity is noted in the local market. Dealers continue to ship against old orders, but no particular pressure for quick delivery is evident. Two of the principal con-

sumers have larger stock piles than they had at this time last year.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$12.75 to \$13.25
No. 2 heavy melting scrap	11.00 to 12.00
Scrap rails	12.00 to 12.50
Hydraulic comp. sheets	11.25 to 12.25
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.00 to 11.50
No. 1 bushelling	11.25 to 12.50
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	6.00 to 7.00
No. 1 railroad wrought	10.00 to 10.50
Acid Open-Hearth Grades:	
Knuckles and couplers	15.00 to 15.50
Coil and leaf springs	15.00 to 15.50
Roller steel wheels	15.00 to 15.50
Low phos. billet and bloom ends	16.50 to 17.00
Electric Furnace Grades:	
Short shov. steel turnings	9.75 to 10.25
Blast Furnace Grades:	
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
No. 2 bushelling	7.00
Rolling Mill Grades:	
Steel car axles	16.00 to 16.50
Iron axles	19.00 to 19.50
Cupola Grades:	
No. 1 machinery cast	11.00 to 12.00
Stove plate	10.25 to 10.50
Locomotive grate bars	8.25 to 9.25
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Industrial	14.25 to 15.25
Railroad	14.25 to 15.25
Agricultural	14.25 to 15.25
Special Grades:	
Chemical borings	11.50 to 12.00

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$2.60
Black wire, base per 100 lb.	3.20

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
Per Cent Off List	
Tank rivets, 1/4-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Billets and Blooms		Sheet Bars		Skelp	
Per Gross Ton		(Open Hearth or Bessemer)		(F.o.b. Pittsburgh or Youngstown)	
Revolving, 4-in. and under 10-in., Pitts-		Pittsburgh	Per Gross Ton	Grooved	Per Lb.
burgh	\$31.00	Youngstown	\$31.00	Universal	1.70a.
Revolving, 4-in. and under 10-in., Youngs-	\$1.00	Cleveland	\$1.00	Sheared	1.70a.
town					1.70a.
Revolving, 4-in. and under 10-in., Cleve-	\$1.00	Slabs		Wire Rods	
land		(8 in. x 2 in. and under 10 in. x 10 in.)		(Common soft, base)	
Revolving, 4-in. and under 10-in., Chicago.	\$2.00	Pittsburgh	Per Gross Ton	Pittsburgh	Per Gross Ton
Forging quality, Pittsburgh.	\$6.00	Youngstown	\$31.00	Cleveland	\$35.00
		Cleveland	\$1.00	Chicago	\$5.00
					\$7.00

Ores		Ferromanganese		Fluxes and Refractories	
Lake Superior Ores, Delivered Lower Lake Ports		Per Gross Ton		Fluorspar	
Old range Bessemer, 51.50% iron	\$4.80	Domestic, 80%, seaboard	\$94.00 to \$98.00	Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
Old range non-Bessemer, 51.50% iron	4.65	Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00	No. 2 lump, Illinois and Kentucky mines	20.00
Mesabi Bessemer, 51.50% iron	4.65	Spiegeleisen		Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 18.50
Mesabi non-Bessemer, 51.50% iron	4.50	Per Gross Ton Furnace		Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines	32.50
High phosphorus, 51.50% iron	4.40	Domestic, 19 to 21%	\$31.00 to \$35.00		
Foreign Ore, c.i.f. Philadelphia or Baltimore		Domestic, 16 to 19%	29.00 to 32.00	Fire Clay Brick	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.	Electric Ferrosilicon		Per 1000 f.o.b. Works	
Iron ore, low phos., Swedish, average 68% iron	11c.	Per Gross Ton Delivered		High-Heat	Intermediate
Iron ore, basic Swedish, average 65% iron	9c.	50%	\$83.50	Duty Brick	Heavy Duty Brick
Manganese ore, washed 52% manganese, from the Caucasus	26c. to 28c.	75%	190.00		
Manganese ore, Brazilian, African or Indian, basic 50%	26c. to 28c.	Per Gross Ton		Pennsylvania	\$43.00 to \$46.00
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$14.00	10%	\$35.00	Maryland	43.00 to 46.00
Chrome ore, 45 to 50% Cr ₂ O ₃ crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00	11%	37.00	New Jersey	50.00 to 65.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	60c. to 55c.	Bessemer Ferrosilicon		Ohio	43.00 to 46.00
		F.o.b. Jackson County, Ohio, Furnace		Kentucky	43.00 to 46.00
		Per Gross Ton		Missouri	43.00 to 46.00
		10%	\$26.50	Illinois	43.00 to 46.00
		11%	28.50	Ground fire clay, per ton	7.00
		12%	30.50	Silica Brick	
		Silver Iron		Per 1000 f.o.b. Works	
		F.o.b. Jackson County, Ohio, Furnace		Pennsylvania	\$43.00
		Per Gross Ton		Chicago	52.00
		6%	\$21.00	Birmingham	50.00
		7%	21.50	Silica clay, per ton	\$8.50 to 10.00
		8%	22.00		
		9%	22.50		
		10%	23.00		
		Other Ferroalloys			
		Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads			
		Ferrovanadium, per lb. contained vanadium, f.o.b. furnace			
		Ferrocarbondium, 15 to 18%, per net ton, f.o.b. furnace, in carloads			
		Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton			
		Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton			

Bolts and Nuts		Bolts and Nuts		Small Rivets	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)		Per Cent Off List		(1/8-in. and smaller)	
Machine bolts	73	Semi-finished hexagon nuts	73	F.o.b. Pittsburgh	70, 10 and 5
Carriage bolts	73	Semi-finished hexagon castellated nuts, S.A.E.	73	F.o.b. Cleveland	70, 10 and 5
Lag bolts	73	Stove bolts in packages, P'gh.	80, 10, 10 and 5	F.o.b. Chicago	70, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7 heads	73	Stove bolts in packages, Chicago	80, 10, 10 and 5	Cap and Set Screws	
Hot-pressed nuts, blank or tapped, square	73	Stove bolts in packages, Cleveland	80, 10, 10 and 5	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Hot-pressed nuts, blank or tapped, hexagons	73	Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2 1/2	Per Cent Off List	
C.p.c. and t. square or hex. nuts, blank or tapped	73	Stove bolts in bulk, Chicago	80, 10, 10, 5 and 2 1/2	Milled cap screws	80, 10, 10 and 5
Washers*	73	Stove bolts in bulk, Cleveland	80, 10, 10, 5 and 2 1/2	Milled standard set screws, case hardened	80 and 5
		4 1/2 in. bolts	60, 10 and 10	Milled headless set screws, cut thread	75 and 10
		Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.		Upset hex. head cap screws, U.S.S. thread	85 and 10
		Large Rivets		Upset hex. cap screws, S.A.E. thread	85 and 10
		(1/2-in. and larger)		Upset set screws	80, 10 and 5
		Base per 100 Lb.		Milled studs	70
		F.o.b. Pittsburgh or Cleveland	\$2.75		
		F.o.b. Chicago	2.85		

Fabricated Structural Steel

New Projects Totaling 37,000 Tons Include 7000-Ton Jail and 8000-Ton Office Building—Awards Small

NEW fabricated steel projects of the week totaled in excess of 37,000 tons and included 7000 tons in a penitentiary on Rikers Island, New York, 8000 tons in an office building for the House of Representatives in Washington, 5000 tons for rebuilding the State Street bridge in Chicago, and 5000 tons in a building in Los Angeles for the Pittsburgh Plate Glass Co.

Awards reached only 21,000 tons, the smallest total since the second week in July. Included were 2500 tons in a building for the Fidelity National Bank & Trust Co., Kansas City, Mo., 2000 tons in an apartment building at 422 East Eighty-sixth Street, New York, 1100 tons in an apartment building at Eighty-second Street and West End Avenue, New York, and 3000 tons in an office building, Montreal. Awards follow:

North Atlantic States

STATE OF MAINE, 975 tons, bridges; 625 tons to American Bridge Co., 350 tons to Boston Bridge Works, Inc.
CAMDEN, N. J., 500 tons, warehouse for New Jersey Port Commission, to McClintic-Marshall Co.
STATE OF MARYLAND, 200 tons, highway bridge, to American Bridge Co.
NEW YORK, 450 tons, column cores for New York Telegram building on West Street, to Levering & Garrigues.
NEW YORK, 2000 tons, apartment building, 422 East Eighty-sixth Street, to A. E. Norton.
NEW YORK, 1100 tons, apartment building, Eighty-second Street and West End Avenue, to Bethlehem Fabricators, Inc.
NEW YORK, 1072 tons, dormitory for Columbia University, to Hedden Iron Construction Co.
NIAGARA FALLS, N. Y., 575 tons, Hyde Park school, to Buffalo Structural Steel Co.
PHILADELPHIA, 500 tons, Kennett Square school, to McClintic-Marshall Co.

The South

BONCAR, W. VA., 765 tons, steam plant for West Virginia Hydroelectric Co., to Lackawanna Structural Steel Co.
NEW ORLEANS, 750 tons, Bienville Street wharf, to Virginia Bridge & Iron Co.
BIRMINGHAM, 400 tons, Tennessee Coal, Iron & Railroad Co. strip mill, to Virginia Bridge & Iron Co.
AUGUSTA, GA., 940 tons, State highway bridge, to Nashville Bridge Co.
MONTGOMERY, ALA., 175 tons, Air Corps Tactical School, to Nashville Bridge Co.
ASHLAND, KY., 650 tons, building for American Rolling Mill Co., to Hiner Structural Steel Co.

Central States

TOLEDO, 1400 tons, evaporators and towers for Pure Oil Co., to Warren City Tank & Boiler Co.
RACINE, WIS., 600 tons, tank and tower, to Greeman Mfg. Co., local.
CHICAGO & NORTH WESTERN, 500 tons, subway, to Mississippi Valley Structural Steel Co.
LA GRANGE, ILL., 1200 tons, grade crossing, to Gage Structural Steel Co.
KANSAS CITY, Mo., 2500 tons, Fidelity National Bank & Trust Co., to Kansas City Structural Steel Co.
BAGNELL, Mo., 500 tons, power house, Stone & Webster, Inc., to Stupp Brothers Bridge & Iron Co.
ST. LOUIS, 500 tons, Globe-Democrat building, to Mississippi Valley Structural Steel Co.

Western States

SAN FRANCISCO, 165 tons, sheet piling,

Honolulu Oil Co., to Pacific Coast Steel Corp.

BELLINGHAM, WASH., 100 tons, Acme bridge, to Pacific Car & Foundry Co.
ANACORTES, WASH., 2000 tons, plates, pipe line, to Puget Sound Machinery Depot.

Canada

MISSION, B. C., 200 tons, bridge for Great Northern Railway Co., to Western Bridge Co., Vancouver.
VANCOUVER, B. C., 100 tons, plates, treating cylinder and tanks for Vancouver Creosoting Co., to Vulcan Iron Works.
COLEBROOK, B. C., 125 tons, bridge for Great Northern Railway Co., to Western Bridge Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

TYNGSBORO, MASS., 1200 tons, State bridge.
WALTHAM, MASS., 143 tons, hospital group.
TORRINGTON, CONN., unstated tonnage, theater.
NEW YORK, 700 tons, apartment building on East Seventy-first Street.
NEW YORK, 1200 tons, apartment building, Madison Avenue, near Ninetieth Street.
NEW YORK, 7000 tons, penitentiary for city on Rikers Island.
SOUTH ORANGE, N. J., 200 tons, building for New Jersey Bell Telephone Co.
WASHINGTON, 8000 tons, office building for House of Representatives.
NICKEL PLATE RAILROAD, 120 tons, bridge at Athol Springs, N. Y.
PITTSBURGH, 1630 tons, three Allegheny County bridges, for State Highway Department.
PITTSBURGH, 1460 tons, six barges for Gulf Refining Co.; bids taken Sept. 22.

The South

TYNER, TENN., 1000 tons, highway toll bridge; Virginia Bridge & Iron Co., low bidder.
STATE OF KENTUCKY, 19,521 tons, bids received for 10 bridges; these are in addition to 3190 tons for Ashland bridge reported placed last week.
CARROLLTON, KY., 4900 tons, bridge over Ohio River; American Bridge Co., low bidder.
DALLAS, TEX., 450 tons, Y. M. C. A. building, Nathan Wohfeldt, Dallas, general contractor.

Central States

CANTON, OHIO, 270 tons, Catholic Home.
TOLEDO, tonnage unstated, United States Court House.

CHICAGO, 5000 tons, rebuilding State Street bridge; bids to be asked with completion of subway plans.

CHICAGO, 400 tons, International House at University of Chicago.

STATE OF MINNESOTA, 600 tons, highway bridge.

CHICAGO, 2600 tons, Steinmetz high school; Midland Structural Steel Co., low bidder.

Western States

TULSA, OKLA., 600 tons, Post Office, Charles Weitz & Son Construction Co., Des Moines, Iowa, general contractors.
LOS ANGELES, 5000 tons, Pittsburgh Plate Glass Co.

LOS ANGELES, 560 tons, bridge over Los Angeles River at Atlantic Avenue; bids opened.

SAN DIEGO, 260 tons, plates, 55,000-bbl. tank for naval operating base; bids opened.

SAN FRANCISCO, 100 tons, apartment building, Pacific and Baker streets; bids being taken.

Canada

MONTREAL, 3000 tons for Empire Trade Building for John F. Hansen, care Ernest Pitt & Co., 179 Craig Street West.

Railroad Equipment

New York, New Haven & Hartford has ordered 10 electric passenger locomotives from General Electric Co.

Illinois Steel Co. has ordered 10 roll transfer cars from Lorain Steel Co.

National Tube Co. is inquiring for 10 standard gage car trucks, 70 tons' capacity.

Central of Brazil Railroad is inquiring for 10 locomotives of 2-10-4 type; Romero Zander, director, Rio de Janeiro, Brazil.

Fabricated Structural Orders Fall in August

WASHINGTON, Sept. 23.—Orders for 217,174 net tons of fabricated structural steel in August were reported to the Department of Commerce by the principal producers, and compare with reported orders of 231,591 tons in July.

Computed bookings were 264,000 tons, or 66 per cent of capacity, compared with 280,000, or 70 per cent of capacity in July. Computed bookings in the first eight months of 1930 were 2,116,000 tons, or 66 per cent of capacity, against 2,625,700 tons, or 85 per cent of capacity in the corresponding period of last year.

Detroit Scrap Unchanged

DETROIT, Sept. 23.—No further declines have occurred in the Detroit district on old material during the past week, but at the same time there have been no strengthening factors.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$11.25 to \$11.75
Borings and short turnings	5.75 to 6.25
Long turnings	5.75 to 6.25
No. 1 machinery cast	11.00 to 11.50
Automotive cast	12.25 to 12.75
Hydraul. comp. sheets	11.25 to 11.75
Stove plate	9.00 to 9.50
New No. 1 busheling	9.50 to 10.00
Old No. 2 busheling	5.50 to 6.00
Sheet clippings	8.00 to 8.50
Flashings	10.00 to 10.50

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Foreign Buying of Copper Gains as Price Is Again Lowered

NEW YORK, Sept. 23.

Copper

Notwithstanding the belief in some quarters that the price of copper has not yet reached bottom, although it is at its lowest level since 1896, there has been some investment buying by large consumers. Some of this has extended into the first quarter, and several large public utility companies are said to be anxious to cover their requirements for the first half. Except for these transactions, domestic buying has not been large, but most consumers are covered through October and many of them for all of the final quarter.

Foreign buying has increased in the past few days, following the reduction of the export price of Copper Producers, Inc., on Sept. 19 to 10.80c., c.i.f. European ports. The export price had previously been reduced on Sept. 16 to 11.05c. from 11.30c. The total of export sales thus far in September is about 21,500 tons, which represents a gain of about 25 per cent over the sales in the same period of August. The domestic price for electrolytic copper is now steady at 10.50c., delivered, and no deviations have been reported. Deliveries this month have been larger than in the corresponding period of August, but it is not known yet whether this increase will be sufficient to bring a reduction in stocks.

Tin

Although the price of tin has been declining fractionally during the past week, there has been a fair amount of buying, mostly by consumers, whose present policy seems to be to take on metal on declines rather than on strength. The price weakness is due partly to the continued menace of large stocks and to weakness in London, where German political disturbances seem to have had some effect on the market. A slightly favorable indication is that business has been done as far ahead as next March, the premiums running about 15 points a month over the spot price. On Sept. 19, for example, with the spot price for Straits tin at 29.60c., sales for March were made at 30.30c.

Store stocks in London on Monday amounted to 25,446 tons, a gain of 97 tons in the week, while official stores in New York on Monday were 3963 tons, against 4633 tons on Sept. 1. London prices are off £2 or more a ton, as compared with a week ago, but the Singapore price is fairly steady. This latter situation is due

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 23	Sept. 22	Sept. 20	Sept. 19	Sept. 18	Sept. 17
Lake copper, New York.....	10.50	10.50	10.50	10.50	10.50	10.50
Electrolytic copper, N. Y.*	10.25	10.25	10.25	10.25	10.25	10.25
Straits tin, spot, N. Y.	29.75	29.32½	29.50	29.60	29.80	29.87½
Zinc, East St. Louis.....	4.25	4.25	4.25	4.25	4.27½	4.30
Zinc, New York.....	4.60	4.60	4.60	4.60	4.62½	4.65
Lead, East St. Louis.....	5.35	5.35	5.35	5.35	5.35	5.35
Lead, New York.....	5.50	5.50	5.50	5.50	5.50	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

to the fact that, aside from concerted efforts to curtail production, the mines are reducing output on their own accord because the low prices make mining operations unprofitable. London prices today were £131 15s. for spot standard, £133 10s. for future standard, £133 12s. 6d. for spot Straits. The Singapore price was £137 15s.

Lead

There is no change in this market. Prices are the same as a week ago. Demand has been fairly steady, though not large. Quotations are 5.35c., St. Louis, in the outside market, with the price of the leading interest remaining at 5.50c., New York.

Zinc

While there have been bids for zinc at less than 4.25c. a lb., East St. Louis, that price seems to be holding fairly firm in a market which lacks

sufficient volume to maintain backlogs.

Ore has declined to \$30 a ton, having lost its recent gain of \$1 a ton and another dollar on top of that. Purchases of ore in the past week were light at 3040 tons, compared with about 9000 tons in the previous week. Output was 8500 tons. Surplus stocks of ore are estimated at about 36,600 tons.

Antimony

Some sales of antimony have been made for delivery in the early part of 1931. Spot demand continues light. The spot price is 7.62½c. a lb., duty paid, while futures are selling at 7.50c.

Nickel

The long-established quotations continue at 35c. a lb. for wholesale lots of ingot nickel, with shot nickel at 36c., and electrolytic nickel in cathodes at 35c.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	17.25c.
Copper, hot rolled, base sizes.....	20.25c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	22.50c.
Seamless Tubes—	
Brass	22.25c.
Copper	22.50c.
Brass Rods	15.37½c.
Brazed Brass Tubes.....	24.87½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets, open.....	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	32.00c. to 33.00c.
Tin, bar	34.00c. to 35.00c.
Copper, Lake	12.25c.
Copper, electrolytic	12.00c.
Copper, casting	11.75c.
Zinc, slab	6.25c. to 7.25c.
Lead, American pig.....	6.00c. to 7.00c.
Lead, bar	8.00c. to 9.00c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½.....	22.50c. to 23.50c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	34.75c.
Tin, bar	36.75c.
Copper, Lake	11.63c.
Copper, electrolytic	12.25c.
Copper, casting	11.25c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig.....	6.25c. to 6.50c.
Lead, bar	8.75c.
Antimony, Asiatic	12.50c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade.....	38.00c.
Solder, ½ and ½.....	21.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.75c.	9.50c.
Copper, hvy. and wire	8.50c.	9.25c.
Copper, light and bottoms	7.50c.	8.25c.
Brass, heavy.....	5.00c.	6.25c.
Brass, light.....	4.25c.	5.25c.
Hvy. machine composition	7.75c.	8.50c.
No. 1 yel. brass turnings	5.50c.	6.25c.
No. 1 red brass or compos. turnings...	7.00c.	8.00c.
Lead, heavy.....	4.25c.	4.75c.
Lead, tea.....	3.00c.	3.50c.
Zinc	2.25c.	2.75c.
Sheet aluminum.....	7.50c.	9.50c.
Cast aluminum.....	7.00c.	9.00c.

Reinforcing Steel

Awards 5200 Tons—Inquiries Light

AWARDS of reinforcing steel the past week totaled 5200 tons, the largest, 800 tons, for cattle pens at West Philadelphia for the Pennsylvania Railroad. New projects include no sizable jobs and were the lightest in many weeks, totaling only 1800 tons. Awards follow:

BROOKLYN, 250 tons, Avenue Z sewer; placed by Picone Contracting Co., Brooklyn, with Igoe Brothers.

BERGEN COUNTY, N. J., 750 tons, approaches to Fort Lee bridge; placed by George M. Brewster & Son with Concrete Steel Co.

ELMIRA, N. Y., 250 tons, telephone building; placed by White Construction Co. with Kalman Steel Co.

PENNSYLVANIA RAILROAD, 800 tons, cattle pens at West Philadelphia, to Turner Construction Co.

STATE OF KENTUCKY, 141 tons, substructure for bridge at Maysville, to Dravo Contracting Co.

CHICAGO, 440 tons, dormitory at University of Chicago, to Joseph T. Ryerson & Son.

CHICAGO, 100 tons, road work, to Calumet Steel Co.

SPRINGFIELD, ILL., 520 tons, highway bridge work, to an unnamed bidder.

LOS ANGELES, 650 tons, five apartment buildings, all to unnamed bidders.

SAN DIEGO, 200 tons, pier extension, Naval Operating Base, to an unnamed bidder.

LONG BEACH, CAL., 500 tons, Procter & Gamble plant, to an unnamed company.

PASADENA, CAL., 260 tons, addition to Rose Bowl, to an unnamed bidder.

MONITOR, WASH., 100 tons, bridge over Wenatchee River, to Northwest Steel Rolling Mills.

LILLOOET, B. C., 100 tons, bridge for Pacific Great Eastern Railroad, to an unnamed company.

COOK COUNTY, ILL., 200 tons, highway bridge, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

TYNGSBORO, MASS., 225 tons, State bridge.

WALTHAM, MASS., 135 tons, hospital group.

BERGEN COUNTY, N. J., 1400 tons, State highway route 4, section 3; general contract awarded to Consolidated Production Co., Hackensack, N. J.

ATTICA, N. Y., 280 tons, cell-block for new State prison.

CHICAGO, tonnage being estimated, public school units.

SPRINGFIELD, ILL., tonnage not stated, State highway work; bids opened Sept. 22.

ST. LOUIS, 350 tons, Maline Creek sewer; Fruin-Colnon Construction Co., general contractor.

LOS ANGELES, 400 tons, jail; bids Oct. 8.

LOS ANGELES, 350 tons, apartment building, Sunset Boulevard near Kings Road; bids being taken.

LOS ANGELES, 200 tons, apartment building, 500 East Oxford Street; bids being taken.

LOS ANGELES, 200 tons, apartment building, Beverly Boulevard and Gramercy Place; bids being taken.

per cent, but in 1930 was more than 12½ per cent. This increase, it was stated, was not confined to one or two commodities, but was shared by most of the major groups. Metal manufactures, other than machinery and vehicles, the Secretary said, increased 4% per cent in value.

Iron Ore Shipments Are Declining

Iron ore shipments are gradually tapering because of additional suspensions of shipping orders by consumers. Suspensions have been rather numerous the past week or two and, while they are for small lots, the aggregate tonnage is sizable. Boats are being laid up for lack of cargoes, and it is estimated that about 100 ore carriers are now tied up.

Consumption of Lake ore in August was 3,673,161 tons, a decrease of 164,406 tons from July, according to the monthly report of the Lake Superior Iron Ore Association. In August, last year, 5,779,137 tons was consumed. Ore at furnaces Sept. 1 amounted to 29,397,236 tons. The amount at furnaces and Lake Erie docks on that date was 34,938,012 tons, compared with 33,830,946 tons on the same date a year ago. There were 123 furnaces using Lake ore in blast Aug. 31, a loss of seven for the month. Central district furnaces during August consumed 1,904,727 tons, a decrease of 91,955 tons as compared with July. Lake front furnaces melted 1,645,111 tons, a decrease of 52,982 tons, and all-rail furnaces used 75,636 tons, a decrease of 20,067 tons. Eastern furnaces melted 47,687 tons, a gain of 598 tons.

Republic Steel Reports Gain in Orders

Orders booked by the Republic Steel Corp. during the first three weeks of September were 17 per cent ahead of those of the same period in August, according to company officials. The improvement represents increased sales of strip, sheets, electric welded pipe and other products. Alloy steel orders are holding the gains which appeared last month. As a result of the betterment in orders, operations are gradually increasing. Two additional open-hearth furnaces, one at Youngstown and the other at Warren, have been put in operation. Sheet mill operations will be increased this week.

Jones & Laughlin to Add Bar Mill at Pittsburgh

The Jones & Laughlin Steel Corp., Pittsburgh, is spending about 40 per cent of \$21,000,000 recently appropriated by the company for plant improvements at its Pittsburgh works. A new bar mill, to have an annual capacity of about 250,000 tons, ranging from 1 to 3 in. in size, will be erected at the Pittsburgh works. A contract for this mill has been awarded to the Morgan Construction Co., Worcester, Mass., at the same plant a boiler and power plant, designed to furnish power for opera-

tion of the new bar mills and other units on both sides of the Monongahela River, is under way. An extension to the polishing mill at the Hazelwood works will also be built. The remainder of the improvement program will take place at the company's works at Aliquippa, Pa.

Business Decline Is Ended Says Secretary Lamont

WASHINGTON, Sept. 23.—It is perfectly clear that business on the whole has ceased the marked decline which was characteristic of a number of earlier months and there are some distinctly encouraging features, according to Secretary of Commerce R. P. Lamont. Discussing the business situation at a newspaper conference yesterday, the Secretary said that the most encouraging aspects are the growth of export trade as revealed by the August statistics and the distinct picking up in retail trade in the United States. These signs were held to be plain, despite the fact that the various weekly and monthly business indicators which are coming in in a steady stream are more or less mixed in their trends.

The increase of exports during August, Mr. Lamont said, was more than is customary at this season. During the years 1922-1929 the increase between July and August averaged 5½

Great Lakes Steel to Install 10-In. Mill

Directors of the National Steel Corp. have authorized the Great Lakes Steel Corp., its Detroit subsidiary, to proceed with the erection of a 10-in. merchant mill. Work on this mill will be started shortly, and it probably will be completed and in operation by June 1, 1931. A 14-in. merchant mill is now in the course of construction at the Detroit plant and will be in operation early in December.

These two mills, in addition to the new mill now being installed at the Weirton, W. Va., plant of Weirton Steel Co., another subsidiary, will give National a wide range of merchant material.

Anaconda Wire Co., subsidiary of Anaconda Copper Co., has booked an order from the Pacific Gas & Electric Co. for 4,250,000 lb. of cable conductor.

Automobile Output This Month Will Fall Below August Total

DETROIT, Sept. 22.

DESPITE a mild gain in retail sales, automobile production this month is not likely to be more than 225,000 cars and possibly may be nearer 210,000. This would compare with 240,000 units in August. Two of the larger low-priced car makers are reported to be encouraged by a definite and somewhat unexpected upturn in retail orders. General Motors dealers delivered 86,426 cars to customers in August, against 80,147 in July, and factory sales to dealers showed a corresponding improvement. During the first 10 days of September new car sales by Oakland-Pontiac dealers, increased 51 per cent, compared with the same period in August. Demand for the new Packard line, announced about 10 days ago, has been gratifying to the management; the same situation exists at Cadillac-LaSalle, where output is running around 175 cars a day, five days a week.

The Chevrolet Motor Co. is understood to be preparing a heavy production schedule for its new models, hoping to attain an output of 60,000 units in October and approximately the same number in November. Since the company is planning to put its 1931 line on the market as early as possible and dealers must be stocked, it is reasonable to believe that operations next month will be close to these figures. It is said that the new Chevrolet will not embody any radical changes in mechanical features or in body design. Attention has been concentrated mostly on making the car smarter in appearance, with two inches added to its length and possibly its weight increased slightly. The public will have more variety in colors from which to choose. So far as prices are concerned, no authentic information is available, but no one would be surprised if they were lower than at present. This seems logical in view of the intense competition in the low-priced market and the desire of General Motors to keep Chevrolet the leader among the light sixes.

Many New Models Introduced

THERE is an influx of new models in an effort on the part of manufacturers to stimulate the public's interest. The new Packard differs little in appearance from the old, but it drives and rides more easily, has some

Automobile output this month is not likely to be more than 225,000 cars and possibly may be nearer 210,000, as against 240,000 in August.

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Chevrolet reported to have schedule of 60,000 cars in October and same number in November. New car not expected to embody radical changes in mechanical features or body design.

* * *

Ford's 1930 production estimated at 1,600,000 units, compared with 1,950,000 in 1929.

* * *

Automobile makers are seeking to place steel requirements through the first quarter of 1931 at present low prices, but have not yet been successful.

* * *

Influx of new models indicates automobile manufacturers are trying to stimulate sales as quickly as possible instead of waiting to introduce their new lines until the January show.

embellishments for the added comfort of the occupants and is selling for a thousand dollars less than formerly. The Cadillac V-12 is to be shown early in October, the prices ranging from \$3,795 for the two-passenger coupé to \$4,895 for the all-weather phaeton. The eight and 16-cylinder models, as well as the LaSalle eight, already are priced at large reductions. A new four-cylinder car, said to be the largest of the type on the market, has been announced by Durant Motors, Inc. It has an L-head engine developing 50 hp., 200-cu. in. piston displacement, 3 $\frac{1}{8}$ -in. bore and 4 $\frac{1}{4}$ -in. stroke. It is being presented in three body styles with 112-in. wheelbase and will be sold at \$675 to \$695. This gives Durant two lines of sixes and two lines of fours, as the new Mathis will be a four.

Production of 50,000 Mathis cars is expected the first year, according to the Durant management, although observers here are inclined to discount

the optimistic statements emanating from sources close to both the Mathis and American Austin people. The new Mathis is said to have a four-cylinder, 30-hp. motor and 97-in. wheelbase, with prices ranging from \$450 to \$750. Detroit is still skeptical about the success in this country of midget cars, especially since they are being marketed at or near Ford prices.

Studebaker has added to its Dictator eight many of the features, including "free wheeling", heretofore confined to its President and Commander lines. In effect this amounts to a price reduction, for the public will get more for its money than formerly. The Hudson Motor Car Co. is busy on the dies and general tooling arrangements for its new models which are likely to be revealed sometime in November. This presages increased production of Hudson and Essex cars in the next 30 days.

The recent introduction of new models as well as the new cars in the offing lead to two general observations. With the decline in business this year, automobile makers have abandoned their policy of waiting until the January automobile show to display their latest products. In addition, most of the models already put out do not embody sharp departures from previous design. That is, nothing spectacularly different has come out of the automobile factories in the way of mechanical design.

Ford's 1930 Output High

PRODUCTION of the Ford Motor Co. in 1930 probably will be 1,600,000 units, compared with 1,950,000 in 1929. Ford's world-wide output in the first eight months of the year amounted to 1,227,000 cars and trucks as against 1,451,000 for the corresponding period last year. Current Ford operations are in the neighborhood of 100,000 units monthly. During the first seven months of 1930 Ford accounted for 41.6 per cent of all new cars registered in the United States. In Wayne County, Mich., in which Detroit is located, Ford registrations of new cars were 51.9 per cent of the total. From January to August inclusive more than three out of five cars registered locally were Fords. The open-hearths and steel rolling mills of the Ford company's Rouge plant, after several weeks' suspen-

sion, are scheduled to resume operations today.

Steel Users Seeking First Quarter Tonnage at Present Prices

STEEL companies are getting little consolation out of the present automobile situation. Two large automobile manufacturers are taking far less than their normal requirements. One is not making fourth quarter purchases because it has large commitments still due on third quarter contracts which have been held up because production has been below the volume anticipated a month or two ago. The other maker's September steel orders are the smallest in a number of months and are said to have omitted any new tonnage for companies making its bodies. At least one important automobile company is about to close for steel in connection with new models and is trying to get steel mills to agree to specification of tonnage at present low prices up to Jan. 20, for delivery during the entire first quarter of 1931. So far the mills have presented a solid front in opposition to this proposal.

In pig iron, as in steel, consumers have inaugurated negotiations looking toward the covering of first quarter needs at existing prices, but furnace interests are reluctant to accept business on that basis, feeling that current quotations are scraping bottom with little likelihood of a further drop. Most significant is the fact that both pig iron and steel consumers seem convinced that prices will not sink below the present level and therefore it would be well for them to substitute long range buying for their recent hand-to-month policy.

Pig iron shipments this month are going to be slightly better than in August unless there is a reversal of conditions the coming week. A decline in releases from certain automobile foundries has been offset by a pickup in demand from consumers in general, including those engaged in making stoves and agricultural implements. Too much importance should not be attached to this fact, although it may be a forerunner of a recovery.

There has been much speculation recently regarding the fate of so-called companion cars. The disap-

pearance from the market of the Marquette in the Buick family and the Erskine from the Studebaker line has led to reports of similar action by other makers. Among the reports was one to the effect that the LaSalle would be dropped by the Cadillac people or that the Cadillac eight

would give way in favor of the LaSalle. In the past week the Cadillac company has seen fit to set at rest this talk by publishing widely a full-page newspaper statement, signed by L. P. Fisher, president, denying any intention to change the present lineup.

Canadian Tariffs Increased

But Changes May Aid United States
by Equalizing of Rates

WASHINGTON, Sept. 23.—The new Canadian tariff, effective provisionally Sept. 17, will have little, if any, effect on rolled iron and steel products from the United States, unless it be through application of new administrative features. Changes in duties on these products in the so-called general classification, which applies to the United States, were confined to plates and fabricated shapes. The duty on plates was increased to \$7 from \$6 a net ton, while the rate on fabricated shapes was increased to 40 per cent from 35 per cent ad valorem. On cast iron pipe, however, the general tariff duty was increased to \$14 a ton from \$10, or 25 per cent, whichever is the higher. The Hawley-Smoot rate on cast iron pipe is 25 per cent, which explains the former provisional general rate in the Canadian tariff. It was, therefore, a countervailing duty, but the new Canadian tariff does entirely away with countervailing duties.

The outstanding changes in the new Canadian iron and steel schedule relate to increased intermediate duties. These duties apply to countries with which Canada has commercial treaties. The general duties apply to countries, including the United States, which do not have commercial treaties with Canada. Without exception, where iron and steel duties have been changed, the intermediate rates have been pushed upward. The result is that, in a number of important instances, the intermediate rates

have been placed on a parity with the general rates, or, in other words, with those applying to imports from the United States.

Tariff May Actually Help United States

Because of this it is conceivable that the new tariff on rolled iron and steel products may be helpful rather than harmful to exportation from the United States. By the same calculation the new tariff might be most injurious to such countries as France, Germany and Belgium, since they have commercial treaties with Canada and come under the intermediate tariff classification. The intermediate duty on cast iron pipe was increased to \$12 from \$9 a ton.

The preferential rates in the Canadian tariff apply to Great Britain and these have been increased on plates and fabricated shapes. The new preferential rate on plates was raised to \$4.25 from \$2 a ton, while the preferential duty on fabricated shapes was increased to 25 per cent from 15 per cent. The preferential duty on cast iron pipe was increased to \$7 a ton from \$5. It will be seen that changes in the general and preferential duties affected the same products, while, without exception, intermediate rates were moved upward in all the iron and steel items affected.

Agricultural Implements May Suffer

No changes were made in duties on metal-working machinery. The most

New and Old Duties in Canadian Tariff on Iron and Steel Products

	General		Intermediate		British Preferential	
	New	Old	New	Old	New	Old
Ingots (ton).....	\$3.00	\$3.00	\$3.00	\$2.50	\$1.50	\$1.50
Blooms, cogged ingots, billets, *n. o. p.; sheet bars, n. o. p. (ton).....	4.50	4.50	4.50	4.00	2.50	2.50
Bars and rods; billets, less than 60 lb. per lineal yd., not further processed than hot rolled, n. o. p. (ton).....	7.00	7.00	7.00	6.00	4.25	4.25
Bars or rods, including billets, less than 60 lb. per lineal yd., hot rolled, as hereunder defined by regulations prescribed by minister: Rods, in coil, not over 0.375 in. in diameter when imported by manufacturers of wire for use exclusively in manufacture of wire in their own factories (ton).....	5.00	5.00	5.00	4.50	2.25	2.25
Plates, hot or cold not more than 40 in. in width, n. o. p. (ton).....	7.00	6.00	6.00	4.00	4.25	2.00
Plain shapes, not further manufactured than hot rolled (ton).....	6.00	6.00	6.00	5.50	4.00	4.00
Beams, angles, etc., further manufactured than hot rolled (ton).....	7.00	7.00	7.00	6.00	4.25	4.25
Fabricated shapes (per cent).....	40	35	35	30	25	15
Cast iron pipe, valued at not more than 5c. a lb. (ton).....	\$14.00	\$10 or 25 per cent	\$12.00	\$9.00	\$7.00	\$5.00

*Not otherwise provided.

important rate revision, however, in the machinery schedule related to agricultural implements, with the result that exports from the United States may be adversely affected. Former duties on agricultural implements from the United States ranged from 6 to 10 per cent. The new general rate has been fixed uniformly at 25 per cent. The intermediate rate on agricultural implements has been increased to a single duty of 15 per cent from a range of 6 to 10 per cent. Under the preferential classification agricultural implements continue to be free of duty when imported into Canada. Internal combustion engines for farm purposes valued at not more than \$1,400 continue to be duty free from all countries. The new Canadian tariff, however, carries a provision which authorizes the governor-general, if he sees fit, to fix duties on these engines of 25 per cent under the general, 15 per cent under the intermediate and 10 per cent under the preferential classifications.

On traction engines and parts the general duty was increased to 25 per cent from 15 per cent and the intermediate duty to 15 per cent from 10 per cent, while under the preferential classification these engines are continued duty free.

Rigorous Dumping Regulations

Important changes in the Canadian customs law were made, and are an example of the sweeping power given to the Governor-general. It is through application of these provisions that imports from the United States and other countries may be affected most. The most important change has been in the way of applying dumping duties. While Canada always has had effective anti-dumping regulations, the new provision is much more rigorous than heretofore.

Under the new law the home market value for duty purposes is not to be lower than the selling price to jobbers or wholesalers generally at the time and place of shipment direct to Canada. Whenever the Governor-general regards importations as injurious to Canadian producers, he is authorized to fix the dutiable value of such imports regardless of the home market value. The dumping duty is to be applicable when the actual selling price to Canadian importers is less than either the fair market value or the value for duty purposes fixed by the minister. The additional duty is possible up to 50 per cent ad valorem, instead of 15 per cent.

Decline in Fabricated Plate Orders in August

WASHINGTON, Sept. 23.—Showing a decline of 2205 tons, orders for fabricated steel plate in August totaled 29,235 tons, against 31,440 tons in July, according to Department of Commerce reports from 48 firms. In the first eight months of the present year orders aggregated 282,244 tons, compared with 373,702 tons in the corresponding period of last year.

Metal Congress Convenes

Attendance Large—Officers for American Society for Steel Treating Nominated

CHICAGO, Sept. 23.—Despite adverse business conditions, a large attendance at the National Metal Congress seems assured on the second day of a five-day convention, which is being held in the Stevens Hotel, with several technical organizations taking part under the auspices of the American Society for Steel Treating. Registration in the first two days of at least 3000 is pointed to as indicating a successful week.

At the meeting of the chapter delegates of the A. S. S. T. yesterday morning the nominations for officers and directors for 1931 were made as follows: President, J. M. Watson, metallurgist, Hupp Motor Co., Detroit, advanced from vice-president; vice-president, A. H. D'Arcambal, Pratt & Whitney Co., Hartford, Conn.; secretary for two years, W. H. Eisenman, Cleveland, the present incumbent; directors for two years, B. F. Shepherd, metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J., of the Lehigh Valley chapter, and Frank B. Drake, Johnson Gear Co., Berkeley, Cal., of the Golden Gate chapter, San Francisco. A. O. Fulton, Boston, holds over as treasurer one year more.

The nomination of Mr. D'Arcambal was made unanimous. These nomina-

tions are subject to letter ballot for election between now and Jan. 1.

The National Metal Exposition is housed in several locations in the hotel, and occupies about 35,000 sq. ft., comparing with over twice that space at the congress a year ago in Cleveland. Close to 100 technical papers are being presented at the sessions of the five organizations, covering practically every phase of the metal industry except the foundry. Some new developments of wide interest are being presented and discussed. A feature today is a session on salesmanship, led by Donald B. Clark, Firth-Sterling Steel Co., McKeesport, Pa. It is the first of the kind attempted by the A. S. S. T. and the attendance was about 700.

At the regular dinner of the Institute of Metals and the iron and steel division of the American Institute of Mining and Metallurgical Engineers tonight Dr. B. D. Saklatwalla, vice-president, Vanadium Corp. of America, will deliver a non-technical address on vanadium. At the annual banquet of the A. S. S. T. Thursday evening the Howe medal will be awarded to H. J. French, International Nickel Co., New York.

Business in Commercial Steel Castings Off in August

WASHINGTON, Sept. 23.—Orders for commercial steel castings in August totaled 51,464 net tons, representing 36 per cent of capacity, as against 58,069 tons, or 40 per cent of capacity, in July, according to reports received by the Department of Commerce. Bookings in the first eight months of the present year were 694,511 tons, compared with 929,067 tons in the corresponding period of last year.

August output totaled 64,403 tons, or 45 per cent of capacity, against 79,181 tons, or 55 per cent of capacity in July. In the first eight months of 1930 production was 781,644 tons, or 68 per cent of capacity, as against 910,833 tons in the first eight months of 1929.

Malleable Castings Orders Off in August

WASHINGTON, Sept. 23.—Based on reports from 117 firms, orders for malleable castings in August totaled 25,085 net tons, against 30,064 tons in July, according to the Department of Commerce. In the first eight months

of the current year orders reported were 371,147 tons, compared with 588,447 tons in the corresponding period of 1929.

Output of malleable castings in August was 25,207 tons, against 37,742 tons in July. Production in the first eight months of 1930 aggregated 401,554 tons, compared with 607,750 tons in the corresponding period of last year.

August Boiler Sales About Same as in July

WASHINGTON, Sept. 23.—Orders were placed in August for 1371 steel boilers with 1,356,751 sq. ft. of heating surface, against 1309 with 1,410,096 sq. ft. in July, according to reports received by the Department of Commerce from most of the leading producers.

In the first eight months of 1930 orders were booked for 9132 steel boilers with 10,039,605 sq. ft., compared with 12,636, with 13,600,290 sq. ft., in the corresponding period of last year. Declines were recorded in all the principal types except those for the "oil country," which showed a rise of more than 25 per cent.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

CHARLES CURTISS COVENTRY, president, Cleveland Tool & Supply Co., Cleveland, died of pneumonia at his home in Cleveland on Sept. 18 at the age of 65 years. He had been active in the machine tool industry in Cleveland for 35 years, 33 of which he had spent as head of the Cleveland Tool & Supply Co. He was a member of the Union, Mayfield, Country and other Cleveland clubs.

FRANK R. FORD, a member of the firm of Ford, Bacon & Davis, Inc., New York, consulting engineer, of which he was a founder in 1894, died at the Medical Center in New York on Sept. 17, aged 58 years. He was born in Philadelphia and was graduated as a mechanical engineer from the University of Pennsylvania in 1891. From 1917 to 1921 Mr. Ford was a member of the New York and New Jersey Port and Harbor Development Commission, and for the next three years a member of the Port of New York Authority.

WILLIAM CHAFFIN HOWE, sales engineer for many years with the Eastern Bridge & Structural Co., died at his home in Worcester on Sept. 17, aged 60 years.

JOHN LEONARD ESSON, vice-president, Ford, Bacon & Davis, Inc., New York, died suddenly at his home in New York on Sept. 21, aged 52 years. He was a native of Glasgow, Scotland, coming to this country while still a boy. He received his schooling in the Manual Training School in Chicago. After working for several years as an accountant, he entered the field of engineering 23 years ago.

ROBERT A. ORR, a partner in the iron and steel brokerage firm of Robinson & Orr, Columbia Bank Building, Pittsburgh, died at his home in that city on Sept. 13. He was born at Orrstown, Pa., in 1849, but had been located in Pittsburgh for some 60 years. He became identified with Robinson & Orr in 1890, and had also been prominently identified with financial affairs. He was one of the earlier members of the Pittsburgh Stock Exchange and at the time of his death was a director in the Union National Bank, Pittsburgh.

MATTHEW STOLL, founder and president of the Stoll Mfg. Co., LaCrosse, Wis., manufacturer of tools, dies and stampings, died, Sept. 12, after an illness of six months. He was 41 years of age and a native of LaCrosse.

HENRY PHIPPS, at one time a partner of Andrew Carnegie in the development of the iron and steel industry, died at his home in the Lakeville section of Little Neck, N. Y., on Sept.



C. C. Coventry

22, aged 90 years. He was born in Philadelphia and received his schooling in the public schools of Allegheny City, Pa. Mr. Phipps started work as a messenger boy in Pittsburgh. He then became office boy for Dillworth & Bidwell, spike manufacturers, and was promoted to bookkeeper. It was during this time that he met Andrew Carnegie, then also an office boy. In 1861, he became a partner in Bidwell & Phipps, and soon thereafter also became a partner in a small iron mill firm of Kroman & Phipps. He later became associated with Andrew Carnegie. Mr. Phipps had retired many years ago from active business and for some time had been in poor health.

OSCAR ENOCH LEIGHTON, president and general manager, Ajax Spring Stabilizer Co., Boston, died at a Winchester, Mass., hospital, on Sept. 17, aged 48 years.

Revised Specifications For Copper Base Alloys

At a meeting of the Non-Ferrous Ingot Metal Institute on Sept. 5, formal approval was given to the revised specifications for copper base alloys in ingot form for sand castings, that were unanimously approved last month as tentative by American Society for Testing Materials Committee E-10 on Standards (1315 Spruce Street, Philadelphia). In approving these specifications, the membership of the Non-Ferrous Ingot Metal Institute obligated itself to promote and encourage in every possible manner the use of such specifications in every instance where such specifications could be properly used.

The formulation and approval by the American Society for Testing

Materials of these tentative specifications was the direct outgrowth of a survey made by Non-Ferrous Ingot Metal Institute in 1929, which showed that during the preceding calendar year some 600 different specifications for ingot brass and bronze had been received, and served by the members of the institute. For the popular 85-5-5-5 alloy alone, 40 different specifications had been requisitioned in 1928.

Several months ago, the institute sponsored and is now financing an investigation at the United States Bureau of Standards into the physical properties of the alloys represented by the various specifications that are now adopted. This research will be continued in the belief that the findings will be of substantial value in making further refinements and possible additions to the specifications just approved.

The new specifications cover brass ingot metal for sand castings in 15 different compositions, regularly sold by the trade and arbitrarily herein given numbers 1 to 15, inclusive, to differentiate them from one another. These numbers have no other significance. The classifications follow:

Alloy

Grade No.

- 1 Commercial bronze for general service.
- 2 High pressure steam fittings.
- 3 Steam fittings subjected to moderate pressure.
- 4 High grade red brass for general service.
- 5 Reddish yellow alloy for air, gas and water fittings.
- 6 Valve fittings for low pressure.
- 7 Bearings for heavy pressure (may later be eliminated in favor of No. 8).
- 8 Bearings for heavy pressure (lower cost than No. 7).
- 9 General service bearings.
- 10 Bearings operated at high speed and under light or medium pressure.
- 11 Car journal bearings and similar service.
- 12 Yellowish red alloy for plumbers' fittings.
- 13 Yellow brass for light castings and ornamental work not requiring strength or subjected to internal pressure.
- 14 Yellow brass for heavier castings.
- 15 Plumbers' flanges, scupper pipes, etc.

Contract Let for Remodeling Five Ocean Vessels

WASHINGTON, Sept. 23.—The Federal Shipbuilding & Dry Dock Co., Kearny, N. J., has been awarded a contract, involving approximately \$9,000,000, for remodeling five combination passenger and cargo ships purchased from the Shipping Board by the Baltimore Steamship Co. Loan agreements amounting to \$6,540,000, to apply to reconditioning of the ships, have been signed on behalf of the board by Chairman T. V. O'Connor.

PERSONALS

JOHN J. CONE, president Robert W. Hunt Co., Chicago, who has been identified with that company since its organization in 1888, has retired. C. B. NOLTE, vice-president and general manager, has been elected president and general manager, with headquarters in Chicago. J. C. OGDEN, a director and Eastern manager of the company, has been elected vice-president, with headquarters in New York.

C. STUART TOBIN, who has been associated for the past 25 years with the steel jobbing house of Froment & Co., New York, has severed his connection with that company to enter the life insurance underwriting business.

BURTON L. VERNER, until recently purchasing agent of Interstate Iron & Steel Co., Chicago, has become identified with M. S. Kaplan Co., Chicago, dealers in iron and steel products.

W. J. COLES, director of Edgar Allen & Co., Ltd., Sheffield, England, arrived in New York on Sept. 16, for a month's visit. He will make his headquarters at the company's New York office, 741 Washington Street, and plans to visit the Detroit and Chicago branches. He is attending the National Metal Congress in Chicago this week.

MORRIS STONE of the power engineering department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has been awarded the Benjamin Garver Lamme scholarship, providing one year's advanced study at any college or university in America or Europe. Mr. Stone was graduated from the engineering school of Harvard University in 1923, and after receiving his master's degree two years later, went to work for the Westinghouse company. He spent three years in the research laboratory, engaged in general electricity and vibration problems, and more recently has been in the power engineering department. Mr. Stone's treatise on "The General Torsion Problem" was presented at the Third International Congress of Engineers, held in Sweden this summer. He will study at the Universities of Berlin and Charlottenburg.

H. R. ROWLAND, division manager at Philadelphia for the A. M. Byers Co., Pittsburgh, has been transferred to the latter city in a corresponding capacity, according to an announcement by H. W. RINEARSON, vice-president of the Byers company. E. L. MACWHORTER, recently representative in Western New York, for the Byers

company, has succeeded Mr. Rowland as division manager at Philadelphia.

ELIAS MAYER has resigned from the presidency of the General American Tank Car Corp., effective Oct. 1. Mr. Mayer has taken this step so as to be released from active executive duties. He expects to take a vacation of several months in Europe.

W. C. BUCHANAN, for the last year assistant to the president of the Keystone Steel & Wire Co., Peoria, Ill., has been made vice-president and assistant general manager. Previous to Mr. Buchanan's association with the Keystone Company, he was with the Trumbull Steel Co., and was instrumental in the formation of the Mid-States Steel & Wire Co., Empire Steel and other mergers.

C. MAURITZ JOHNSON, of the Moline Furniture Works, has been elected president of the Moline Manufacturers Club, Moline, Ill. A. E. HAGEBOECK, of the Frank Foundries Corp., has been named vice-president and MAURICE BLOCK, of Deere & Co., has been elected secretary-treasurer of the organization.

ARTHUR MILTNER has been appointed factory manager of the Saginaw Steering Gear Co., Saginaw, Mich., a unit of General Motors Corporation. He formerly was personnel director of the Olds Motor Works, Lansing, Mich., having been succeeded in that position by DANE H. HOOVER.

LOGAN H. ZINTGRAFF, until recently with the Busch-Sulzer Brothers Diesel Engine Co., has been appointed St.

Louis representative, with office at 907 Security Building, by the Steel Improvement & Forge Co., Cleveland, Globe Machine & Stamping Co., Cleveland, Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, and Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.

JAMES W. OWENS, formerly director of welding of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has been appointed director of engineering and secretary of the Welding Engineering & Research Corp., New York. For the past 12 years he has devoted his entire time to the development of welding and cutting. In the spring of 1918 he became associated with the welding research committee of the Emergency Fleet Corp. He was appointed arc welding expert for the Bureau of Construction and Repair of the United States Navy in the fall of that year and was stationed at the Norfolk Navy Yard, his work at the yard including also research for the Bureau of Aeronautics. Mr. Owens became identified with the Newport News company on Jan. 1, 1926. He was vice-president of the American Welding Society from 1920 to 1922.

HERBERT A. MAY, Pittsburgh, has been elected a director of the Union Drawn Steel Co., Beaver Falls, Pa., a subsidiary of the Republic Steel Corp., to fill the unexpired term of the late George Davidson.

GEORGE GORDON CRAWFORD, president, Jones & Laughlin Steel Corp., Pittsburgh, was the guest of honor at the opening seasonal meeting of the Chamber of Commerce of Pittsburgh on Sept. 22.

Phelps-Dodge Acquires a New Subsidiary

The Phelps-Dodge Corp. has acquired control of the National Electric Products Corp., a large manufacturer of metal products for the electrical and building industries, which annually consumes about 200,000,000 lb. of copper and 150,000 tons of steel. National Electric Products will become a subsidiary of Phelps-Dodge Corp. It was organized in 1928 through a merger of the National Metal Holding Co., American Copper Products Corp. and British-American Tube Co. Through a subsidiary, the company owns a majority of the stock of Habirshaw Cable & Wire Corp.

It operates plants at Pittsburgh and Economy, Pa., Bayway, N. J., Bridgeport, Conn., Yonkers and Nepperhan,

N. Y., Fort Wayne, Ind., and Los Angeles, and has offices and warehouses in leading cities of the country.

Louis S. Cates, president of Phelps-Dodge Corp., will become vice-chairman of National Electric Products and officers of the latter company will become directors and members of the executive committee of Phelps-Dodge Corp.

New Iron Ore Discovered

Iron ore of a merchantable grade has been found recently in the vicinity of Spring Valley in southeastern Minnesota. The M. A. Hanna Co. has had representatives in the field examining the extent of the discoveries, but up to the present time there are no definite indications that an important tonnage will be developed.

Outlook for Buying of Shop Equipment Still Obscure

Some Business Is Appearing, But Improvement Is Slow and Not General

THE outlook for an increasing volume of purchases of machine tools and other plant equipment during the remainder of the year is still somewhat obscure. While more prospects are appearing, there is a good deal of hesitancy in placing orders.

In the New York district two large orders were placed, one amounting to \$50,000 and the other to \$30,000, but aside from this business there has been no improvement in the Eastern territory.

The slow progress of the automo-

bile industry toward a better position is retarding machine tool business from that source, but the Briggs Body Corp., Detroit, has issued a list totaling about \$150,000 and two motor car manufacturers have recently placed orders for a few machines each.

Machine tool sellers have a promising array of prospects, some of which were quoted on in the spring without results in the form of orders. The revival of many of these inquiries justifies the expectation that machine tool business will gain when business

has felt the encouragement of a general swing away from the depression of recent months.

It is doubtful whether the gain in machine tool bookings in August, calculated by the National Machine Tool Builders' Association to amount to 25 per cent over those of July, will be projected into this month. It is a matter of comment that a good deal of last month's gain was due to large orders of the Amtorg Trading Corp. for Soviet Russia rather than to any marked bulge in domestic buying.

New York

Aside from the placing of two large orders, one of about \$50,000 by a dry dock company and the other of \$30,000 by a manufacturer, there has been no change in machine tool business. In general there is no improvement. Machine tool sellers have a promising array of prospects, but the business tone has not improved sufficiently to stimulate the placing of orders.

Although the National Machine Tool Builders' Association reported a gain of 25 per cent in machine tool orders for August, compared with July, it is a matter of comment that a good deal of this increase was brought about by orders placed by the Amtorg Trading Corp. for Soviet Russia and not by a change in the domestic volume.

Chicago

The third week in September finds the local machine tool trade somewhat in doubt as to what to expect this fall. Sales are less numerous than in any week so far this month and inquiries are dropping. However, several industrial lists are said to be taking shape and the market can still show fair activity if buyers decide to close old inquiries. Requests for preliminary figures for use in preparing 1931 budgets are now fairly common, but this implies little in pointing the true course of a market. For several years railroads have indicated satisfactory allotments for tools on budgets, but actual purchases have been in small volume. The Chicago Board of Education has purchased several items for the Austin High

School for which it still has to buy a milling machine, a shaper and 18 lathes.

New England

Dealers are securing few new inquiries for tools and are unable to persuade old prospects to cover their requirements. The trade is still of the opinion, however, that business will pick up in October. The New England Shippers' Advisory Board, on the other hand, in its forecast for last quarter railroad car requirements, takes a rather opposite view. It states that machine tool and machinery car requirements for that period will be 30 to 35 per cent less than third quarter; third quarter requirements were less than for second quarter. Used tool dealers report business virtually at a standstill and are devoting most of their time to accumulating equipment.

Small tool buying is on a hand-to-mouth basis, but the weekly aggregate is fairly good.

Milwaukee

Efforts to convert inquiries into sales continue to meet strong resistance, but the volume of new orders is assuming somewhat more bulk than it has shown in recent weeks, and in one or two plants, at least, production schedules are improving under small but gratifying gains in bookings. Spotty characteristics remain in the sales curve, and it is apparent that buying is still being done only as urgent necessities require. The slow progress of the automotive industries toward a better position is retarding machine tool business from that

source, as for many months past. Industries generally are doing little in the way of plant expansion, although there are a few notable exceptions in this locality, chiefly the A. O. Smith Corp., which for at least a year or two has been one of the most important customers in the equipment market.

Pittsburgh

Improvement in orders of local machine tool dealers is still only moderate, but the volume of new inquiries has given the market a much better tone. A feature of the business in prospect is that much of the present inquiry came out earlier in the year and is now being revived. Large industrial lists are lacking and the railroads contemplate little buying this fall. The Pennsylvania is buying equipment for improvements at its Oil City, Pa., shops.

The Carnegie Steel Co. has placed electrical equipment for a new 10-in. bar mill for its McDonald, Ohio, works and will soon complete machinery and equipment purchases for the installation. The Jones & Laughlin Steel Corporation, Pittsburgh, is still buying against its recent inquiries for equipment for its various plants.

Cleveland

While the increase in machine tool inquiries previously reported is being maintained, orders show no improvement. Salesmen find that buyers are now showing an interest in new equipment but are not disposed to make purchases until business shows signs of improvement. More life is apparent in Detroit, where the mar-

ket has been dull for months. Two motor car manufacturers recently purchased a few machines and the Briggs Body Corp. has issued a good-sized list of standard tools largely

for replacement of tool room equipment. The list is reported to total about \$150,000. Dealers are asked to take considerable used machinery that is to be replaced.

New York

AN appropriation of over \$2,000,000 has been made by Sinclair Refining Co., 45 Nassau Street, New York, for extensions and improvements in oil refinery at Cinco, near Houston, Tex. Project will include a 20,000,000-cu. ft. absorption plant.

Cornell & Underhill, Inc., 311 Spring Street, New York, manufacturer of cast iron pipe, has awarded a general contract to Bonanno Brothers, 1872 Bergen Turnpike, North Bergen, N. J., for a one and two-story foundry and plant, 200 x 400 ft., at Hoboken, N. J., to cost about \$85,000 with equipment. W. Tilton, office of general contractor, is architect.

Westchester Iron Works, Inc., Mamaronck, N. Y., care of Paul Rigano, 455 West Boston Post Road, recently organized by Mr. Rigano and associates, plans operation of local mill for general iron and steel working.

New York Telegram, 73 Dey Street, New York, has filed plans for six-story printing plant, 136 x 170 ft., at 150-58 West Street, to include installation of elevating, conveying and other mechanical-handling equipment, power machinery, etc., entire project to cost close to \$3,000,000. Howell & Thomas, 3863 Carnegie Avenue, Cleveland, are architects.

Paramount Ice Co., 241 Ellery Street,

Brooklyn, has filed plans for a new ice-manufacturing plant, to cost over \$50,000 with machinery.

National Silver Deposit Ware Co., 179 Wooster Street, New York, has leased space in building at 44 West Eighteenth Street for new plant. Present works will be removed to new location and capacity increased.

Charles Schaefer, Jr., 332 East 149th Street, New York, architect, has filed plans for a seven-story automobile service, repair and garage building, 75 x 100 ft., at 65-69 West Ninety-ninth Street, to cost close to \$100,000 with equipment.

Illinois Zinc Co., Peru, Ill., has purchased manufacturing rights of extruded battery cups or dry cells, heretofore produced by Extruded Metals Corporation, 184 Fifty-third Street, Brooklyn, a subsidiary of E. W. Bliss Co., Fifty-third Street and Second Avenue, Brooklyn, and will remove equipment at once to plant at Peru, where expansion will be carried out. Extruded Metals Corporation will continue as sales agent for products heretofore manufactured.

Standard Oil Co. of New York, 26 Broadway, has asked bids on general contract for two-story automobile service, repair and garage building and equipment shop at Brooklyn, 100 x 300

ft., to cost close to \$150,000 with equipment. Dietrich Wortmann, 116 Lexington Avenue, New York, is architect.

Bell Telephone Laboratories, Inc., 463 West Street, New York, manufacturer of telephone experimental and radio broadcasting apparatus, has leased three-story building at Summit, N. J., totaling 10,000 sq. ft. floor space, for new plant. Property is near site recently secured for erecting of similar plant later, when works will be consolidated. Company is a subsidiary of American Telephone & Telegraph Co., 195 Broadway, New York.

Lowe Paper Co., River Road, Ridgefield, N. J., has plans for a one-story and basement addition, 46 x 115 ft., primarily for filter press and equipment service, to cost over \$50,000 with machinery. Frederick L. Smith, 21 East Fortieth Street, New York, is engineer.

Board of Education, City Hall, Newark, has work under way on four-story School of Fine and Industrial Arts, to be a successor of Fawcett Art School, to cost close to \$1,000,000 with equipment. Guilbert & Betelle, 20 Branford Place, are architects.

Charles Shilowitz, 26 Journal Square, Jersey City, N. J., architect, has plans for a five-story automobile service, repair and garage building, to cost over \$300,000 with equipment.

New England

CONTRACT has been let by Condit Electrical Mfg. Corporation, 344 Hyde Park Avenue, Boston, manufacturer of oil circuit breakers, switches, etc., to C. A. Dodge Co., 2 Erie Street,

INDUSTRIAL ACTIVITY

Prospects Revealed by a Survey of Construction Projects

PROJECTED construction requiring machinery and other equipment reached a total of about \$18,250,000 in the last week, comparing with \$25,000,000 the week before.

While power generating projects to cost \$11,000,000 exceeded the total reported in the previous week, construction in the oil and gas industries led with more than \$16,000,000 to be expended in improving present facilities. Industrial construction projects, while individually small in most cases, reach a total of close to \$5,000,000, representing some 35 plants and additions in 17 States.

Close to \$1,250,000 of the total new construction is represented by manual training schools to be built in cities of Oklahoma, Michigan, Kansas, North Carolina, Tennessee and Pennsylvania.

Planned expenditures in the oil and natural gas fields include a refinery, to cost \$250,000, for the Gulf Refining Co. in connection with a pipe line from Oklahoma City to Toledo and Pittsburgh. At Luling, Tex., a refinery for a Standard Oil Co. subsidiary will cost about \$400,000, and oil storage tanks at Oklahoma City, Okla., will cost about

\$150,000. An artificial gas plant and distribution lines at Springfield, Mo., will cost \$200,000.

Expansion of electric power facilities reported this week include plans of a West Virginia interest to spend upward of \$2,000,000 for hydroelectric development on the New River and \$8,000,000 to be expended for a similar development on the Muskegon River in Michigan. Extension of a power plant at Puget Sound, Wash., will cost about \$1,000,000, and a substantial part of a \$10,500,000 issue of preferred stock in a Houston, Tex., utility, will be used for power plant and line extensions.

Foremost among industrial projects is the planned expenditure of about \$1,000,000 in improvements at the former plant of the Georgia Manganese & Iron Co., Brunswick, Ga., acquired by E. J. Lavino & Co. and other interests. Other industrial construction includes five plants to manufacture metal products, a \$200,000 ceramic plant at San Antonio, Tex., an addition to an automobile plant at Pine Bluff, Ark., ice plants at Hopewell, Va., and Kansas City, Mo., and two large bus terminals to cost a total of \$400,000 at Oklahoma City, Okla., and Philadelphia.

Cambridge, Mass., for two-story addition and improvements in present factory, to cost about \$60,000. Company is a subsidiary of American Brown Boveri Electric Corp., 420 Lexington Avenue, New York.

C. F. Church Mfg. Co., Willimansett, Mass., manufacturer of sanitary products, a subsidiary of American Radiator & Standard Sanitary Corporation, New York, has acquired former plant of Rubwood Wheel Co., Monson, Mass., and will remodel for production of molded and other sanitary ware specialties.

Malden Electric Co., Malden, Mass., has plans for an equipment storage and distributing plant, to cost about \$55,000 with equipment.

Abraham Newman, Rutland, Vt., and Harry J. Calkins, Rochester, Vt., are organizing a company with capital of \$50,000 to establish and operate an airport at first noted place, where 100 acres has been secured. Project will include hangars, repair shop and other field units. Plans will be drawn at once.

Portland Water District, 16 Casco Street, Portland, Me., has awarded general contract to O. G. K. Robinson, 17 Fitch Street, for two-story automobile service, repair and garage building for company motor trucks and cars at Westbrook, Me., to cost about \$50,000 with equipment.

Torrington Casting Co., Torrington, Conn., is considering plans for a new plant.

City of Holden, Mass., will build a two-story addition, 53 x 140 ft., to grade school to contain a metal-working shop. It will cost \$30,000 without equipment.

United Aircraft & Transport Co., East Hartford, Conn., closes bids this week on two hangars and shops, one and two-stories, 60 x 180 ft.

Boston & Albany Railroad, Boston, has awarded a general contract for machine shop alterations at Brighton, to cost \$50,000.

Boston & Maine Railroad will centralize its passenger car shops at Concord, N. H., and will spend \$450,000 on rearrangement and new equipment.

Waterbury Buckle Co., South Main Street, Waterbury, Mass., has plans for a one-story addition, to cost about \$25,000 with equipment. Joseph DeLauretis, Waterbury, is architect.

South Atlantic

PLANS are being completed by Fred S. Gichner, 1214 D Street, N. W., Washington, manufacturer of ornamental iron products, for two-story plant, to cost about \$50,000 with equipment. Present works will be removed to new location and capacity increased. E. W. Syme is company architect.

Board of District Commissioners, District Building, Washington, is asking bids until Oct. 6 for one gasoline-driven tractor.

Conveying and other mechanical-handling equipment will be installed in three-story storage and distributing plant to be built by Lane Co., Altavista, Va., manufacturer of cedar chests, etc., to replace unit recently destroyed by fire. It will be 100 x 120 ft., and cost over \$70,000 with equipment. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is architect and engineer.

Parker Metal Decorating Co., Ostend and Howard streets, Baltimore, has

leased about 20,000 sq. ft. floor space in building at Paca and Cross Streets for expansion.

Southside Marketing & Finance Corporation, Hopewell, Va., has plans for new cold storage and ice-manufacturing plant, to cost over \$100,000 with machinery. Company will also erect several canning plants near Hopewell and contemplates purchase of automatic canning, sealing and other equipment. C. C. Lewis is company engineer.

Morrison Furniture & Fixture Co., Statesville, N. C., recently chartered with capital of \$100,000, will take over and expand Morrison Mfg. Co., operating local plant for manufacture of store and office fixtures, etc. New organization is headed by W. B. Crowson, Eugene Morrison, Jr., and W. R. Byford, all of Statesville.

Board of Education, High Point, N. C., is considering installation of manual training equipment in new junior high school to cost over \$200,000, for which Harry Barton, Jefferson Building, Greensboro, N. C., is architect.

Officials of Brunswick Terminal & Railway Securities Co., Brunswick, Ga.; E. J. Lavino & Co., Philadelphia, ferromanganese, metals, alloys, etc.; and Palmer & Co., Philadelphia, are arranging for acquisition of plant and properties of Georgia Manganese & Iron Co., near Brunswick, now in receivership; first-noted holds bonds of Georgia company in amount of \$1,500,000. Lavino and Palmer interests will organize company to operate properties and will carry out expansion and improvements to cost close to \$1,000,000.

City Council, Wilson, N. C., has awarded general contract to Beaman & Coleman Construction Co., Lawyers' Building, Raleigh, N. C., for one-story addition to municipal power plant, to cost close to \$40,000 with equipment.

Pennsylvania Railroad Co., Philadelphia, has acquired property on Thirteenth Street, Washington, and plans to use portion of site for new motor bus terminal, with service, repair and garage facilities, to cost over \$250,000. Company engineering department in charge.

General purchasing officer, Panama Canal, Washington, is asking bids until Oct. 6 for bending drill, pumps, copper cloth, turnbuckles, chain links, shackles, and other mechanical equipment.

Bids are being asked (no closing date stated) by Bureau of Yards and Docks, Navy Department, Washington, for a one-story addition, 60 x 110 ft., to hangar at Quantico, Va., airport.

Thomasville Chair Co., Thomasville, N. C., will build a three-story addition, 80 x 300 ft., to cost over \$40,000 with equipment, part of unit to be given over to storage and distribution.

Common Council, Dunn, N. C., is arranging for establishment of municipal airport, with hangar, repair shop and other field units.

Buffalo

PROPERTY has been purchased at Pellicottville, N. Y., by Guenther Mfg. Co., 1281 Jefferson Avenue, Buffalo, manufacturer of gas heating equipment and systems, as site for new one-story plant, to cost over \$45,000 with equipment. Present works will be removed to new location and capacity increased.

In connection with unification of plants and subsidiary interests, General Cable

Corporation, 420 Lexington Avenue, New York, will concentrate considerable production at works at Rome, N. Y. Effective Oct. 1 four divisions of company under which different plants have been operating will lose identities and will be run under General Cable name. Treasurer's department will be removed from New York to Rome.

William F. Endress, Inc., Jamestown, N. Y., recently organized by William F. Endress, 500 Pine Street, and associates with capital of \$500,000, plans operation of local factory for manufacture of refrigerators and refrigerating equipment. Frank H. Field, same address, will be an official of new company.

Niagara Sprayer & Chemical Co., Middleport, N. Y., manufacturer of spraying equipment, etc., plans rebuilding part of one-story unit, 100 x 200 ft., recently destroyed by fire.

L. J. Gauthier, 391 Norfolk Street, Buffalo, has filed plans for a one-story foundry for production of iron castings, to cost about \$21,000 with equipment.

Kitzinger Ornamental Iron Works, Inc., Washington Street, Jamestown, N. Y., has purchased part of former Peterson planing mill property at Falconer, now held by Ellison Bronze Co., and will remodel for new plant, to include manufacture of stairs, grilles, fire escapes, etc.

Detroit

CONTRACT has been let by Barnes Wire Fence Co., 10371 Northlawn Street, Detroit, to G. T. Proctor, 7349 Dunedin Street, for one-story addition, to cost over \$30,000 with equipment.

Metals Process Corp., Detroit, is erecting new one-story plant, 150 x 450 ft., to cost about \$240,000 with machinery. M. J. Hoffman Construction Co., Furniture Building, Evansville, Ind., is architect and contractor.

Consumers Power Co., Jackson, has arranged for a bond issue of \$20,000,000, part of fund to be used for extensions and improvements. Company has work under way on a new hydroelectric power development near Croton on Muskegon River, to cost close to \$8,000,000 with transmission system.

Amplex Mfg. Co., Detroit, recently organized as a subsidiary of Chrysler Corp., will maintain headquarters at 7900 Joseph Campau Avenue and will concentrate for present on Chrysler marine engines, industrial motors and oilite bronze bearings. E. S. Chapman is president and general manager; R. H. Appleman, secretary and treasurer.

Bohn Aluminum & Brass Co., 2512 East Grand Boulevard, Detroit, has asked bids on general contract for one-story plant, 40 x 300 ft., primarily for production of aluminum parts, to cost over \$85,000 with machinery. C. W. Brandt, Francis Palms Building, is architect.

Shell Petroleum Corp., Shell Building, St. Louis, has taken over storage and distributing plant and other properties of Oakland Oil & Gas Co., Pontiac, for price of about \$500,000, and will expand operations in that district.

Board of Trustees, Cranbrook Institute of Sciences, Bloomfield Hills, Mich., has plans for new two-story and basement science unit, with mechanical shops, to cost about \$200,000 with equipment.

Detroit Edison Co., 2000 Second Street, Detroit, has begun construction of one-story equipment storage and distributing

plant in Sylvan Lake Village, to cost over \$45,000 with equipment.

Adrian Foundry & Machine Co., Adrian, recently organized, is arranging for early operations in a local plant, and will specialize in chrome and nickel plating work. Later, company will establish a division for galvanizing work.

Board of Education, Escanaba, is planning installation of manual training equipment in new junior high school to cost about \$450,000, for which general contract has been let to Madsden Construction Co., National Building, Minneapolis, Minn. H. H. Turner, Michigan Trust Building, Grand Rapids, is architect.

Board of Education, Ishpeming, Mich., has commissioned Warren S. Holmes Co., architect, Lansing, Mich., and 820 Tower Court, Chicago, to design new high school to replace structure recently burned. School will contain vocational training facilities. C. L. Phelps is superintendent of schools.

Dow Chemical Co., Bay City, has secured an option on eight acres near Third Street, fronting on Saginaw River, for a coal receiving, storage and distributing plant to handle river shipments from Toledo, Ohio, including conveying and other mechanical-handling equipment.

Philadelphia

BIDS have been asked by Wheeling Corrugating Co., 1234 Hamilton Street, Philadelphia, with headquarters at Wheeling, W. Va., for a one and two-story factory branch and distributing plant, 255 x 260 ft., to cost over \$75,000 with equipment. Company is a subsidiary of Wheeling Steel Co., Wheeling.

Duoflex Piston Ring Co., Fifteenth and Mount Vernon Streets, Philadelphia, has awarded a general contract to Golden Construction Co., 1600 Arch Street, for one-story unit for storage and distribution, to cost about \$30,000 with equipment.

Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, architect and engineer, has filed plans for an automobile service, repair and garage building, to cost about \$125,000 with equipment.

F. & S. Aircraft Corporation, Philadelphia, care of Wolf, Block, Schorr & Solis-Cohen, 1204 Packard Building, attorneys, is being organized by local interests to establish a plant for manufacture and repair of airplanes and equipment.

William J. Ellis, commissioner, Institutions and Agencies, State Office Building, West Hanover Street, Trenton, N. J., will receive bids until Oct. 3 for coal-handling equipment for power station at state village at Skillman. Plans at office of Division of Architecture and Construction.

E. J. Quigley, State House, Trenton, State purchasing agent, is asking bids until Oct. 3 for a set of steel bins and weighing batcher of 100 tons capacity for road construction service, also for a road-finishing machine.

New York Shipbuilding Co., Camden, N. J., has authorized an expansion and improvement program at local shipyard for increased production and repair facilities. Additions will be made in working force.

Krupp-Meyer Foundry Co., Lansdale, Pa., has been organized with a capital of \$50,000 to take over and expand company of same name with plant at North

Cranes

INQUIRY for overhead traveling cranes is still rather small, but there has been some purchasing recently. Among current inquiries is a 3-ton, 18-ft. 11-in. span, single motor crane for Pretty Boy Dam, inquired for by the Department of Public Works, Baltimore.

Purchases of overhead equipment have included a 10-ton, 48-ft. span electric crane by the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., a 10-ton, 72-ft. span crane by the United States Metals & Refining Co., Carteret, N. J., two 2-ton, 60-ft. span, 3-motor cranes from the Northern Engineering Works by the Columbia Steel Shafting Co., Pittsburgh, a 7½-ton, 37-ft. span overhead crane from the Northern Engineering Works by the Stephens-Adamson Co., Aurora, Ill., and a 5-ton, 50-ft. span crane by the Hinde-Dausch Paper Co., Sandusky, Ohio. An inquiry is in the market from the Erie Railroad, New York, for a 25-ton, gasoline or Diesel motor-driven, standard locomotive crane.

Lansdale, manufacturer of iron and other metal castings, machined products, tools, etc. A. A. Krupp is treasurer of new organization. Oscar O. Hoffman, North Wales, Pa., is one of incorporators.

Pennsylvania Power & Light Co., Allentown, Pa., has applied for permission to take over East Buffalo-Union Power & Light Co., and Buffalo-Union Power & Light Co., operating in Union County, and will consolidate. Expansion is planned in Buffalo district, including transmission lines.

United States Cast Iron Foundries, Inc., Catasauqua, Pa., recently formed by George Davies and associates, has taken over local foundry of Davies & Thomas Co., manufacturer of iron castings, and will operate in future. Mr. Davies is son of George Davies, one of founders of Davies & Thomas organization.

Pittsburgh

A 40-ACRE tract at Greenwood, Ind., has been purchased by Gulf Pipe Line Co., Frick Annex, Pittsburgh, a subsidiary of Gulf Refining Co., same address, as site for new steam-operated electric power plant and pumping station, to cost about \$250,000 with equipment. Plant will be used in connection with a new pipe line to be built from Tulsa to Toledo, Pittsburgh and other points, latter project to cost over \$15,000,000.

New Kanawha Power Co., Hawks Nest, W. Va., a subsidiary of Union Carbide & Carbon Corporation, New York, has work under way on power dam on New River, about two miles above junction with Gauley River, for hydroelectric generating station, and has let contract to Westinghouse Electric & Mfg. Co., East Pittsburgh, for initial installation of four prime movers, comprising 30,000 kva. vertical type waterwheel generators, with excitors. Awards for other equipment will be made soon. Project will cost over \$2,000,000.

Roy K. Russell, 510 Pennsylvania Ave-

nue, Warren, Pa., and associates have organized Superb Equipment Co., to operate local factory for manufacture of oil cabinets, gasoline and oil pumps, and kindred products. Warren M. Stone, 605 Conewango Avenue, is also interested in new company.

Pure Oil Co., 35 East Wacker Drive, Chicago, has applied for permission to construct two gasoline unloading pipe lines, with pier supports and mechanical equipment on Ohio River, Wheeling, W. Va., in connection with pipe line project in this section.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, has awarded general contract to H. E. Rogers, 977 Lee Avenue, Knoxville, Tenn., for a one-story factory branch and distributing plant at Knoxville, to cost about \$50,000 with equipment.

Board of Education, Somerset, Pa., plans installation of manual training equipment in new three-story high school to cost about \$175,000, for which bids are being asked on general contract. E. H. Walker & Mong, 226 East Church Street, are architects.

John W. Patton Co., 509 East Main Street, Clarksburg, W. Va., F. C. Debericks in charge, is considering installation of new plant in West End district for manufacture of sheet glass specialties for automobile windshields and kindred service.

Chicago

CONTINUING its expansion program, Vortex Mfg. Co., 421 North Western Avenue, Chicago, manufacturer of paper cups and containers, has awarded general contract to J. W. Snyder Co., 307 North Michigan Avenue, for a four-story addition, 100 x 185 ft., to cost over \$350,000 with machinery. Weiss & Niestadt, 53 West Jackson Boulevard, are architects.

Indiana & Illinois Coal Corporation, Nokomis, Ill., is planning extensions and improvements at mine No. 10, including new tippie, coal-screening plant, and other surface and underground equipment, to cost about \$100,000.

Fort Dodge Gas & Electric Co., Fort Dodge, Iowa, is considering extensions and betterments in electric generating plant and system to cost close to \$500,000 including equipment. Company engineering department is in charge.

Gopher Machine & Tool Works, 100 North First Street, Minneapolis, Minn., has work under way on one-story and basement addition to cost about \$25,000, for which general contract recently was let to T. M. Carlson, 5021 Thomas Avenue South. Lang, Raugland & Lewis, Essex Building, are architects.

Montana Onyx Co., Madison, Mont., will develop a local deposit of onyx and will install production equipment at quarries, as well as finishing, polishing and kindred machinery for mill.

Electric Rotary Machine Co., 3825 West Lake Street, Chicago, has arranged for increase in capital from \$25,000 to \$100,000 for expansion.

City Council, Longmont, Colo., is planning an addition to municipal electric light and power plant for auxiliary service, to cost about \$40,000 with machinery.

Prairie Fibre Mill, Inc., Cooperstown, N. D., has approved plans for new mill, to cost close to \$70,000 with equipment.

Oakland Foundry, Belleville, Ill., manu-

facturer of stoves and steel castings, was damaged by fire Sept. 8, with loss of about \$500,000.

Consolidated Coal Co., Herrin, Ill., is planning rebuilding part of tippie and re-screening plant at its Consolidated No. 7 mine, near Herrin, recently destroyed by fire.

Gulf States

PLANS have been filed by Huey & Phillips Hardware Co., 1029 Elm Street, Dallas, Tex., for two-story storage and distributing plant, to cost about \$30,000 with equipment.

Magnolia Petroleum Co., Dallas, Tex., a subsidiary of Standard Oil Co. of New York, has authorized an expansion and improvements at oil refinery near Luling, Tex., with installation of additional equipment, to cost over \$400,000.

First Texas Chemical Co., 1814 North Lamar Street, Dallas, Tex., is considering new three-story and basement plant, to cost over \$65,000 with machinery.

Ouachita Parish Police Jury, Monroe, La., has taken bids for a one-story hangar at Selman air field, 110 x 130 ft., with repair and reconditioning facilities, to cost about \$30,000. Samuel Collins is engineer in charge.

Southwest Ceramic Products Co., Independence, Mo., recently organized by Christian Friderichsen, head of Friderichsen Floor & Wall Tile Co., and associates, is considering new floor and wall tile plant near San Antonio, Tex., to cost over \$200,000 with presses, conveyors and other machinery. A one-story boiler plant will be built.

Electric Power & Light Corporation, operating United Gas Corporation, Houston, Tex., and other natural gas and electric power properties in several States, is disposing of a preferred stock issue of \$10,050,000, part of proceeds to be used for expansion and improvements.

Florida Fruit Packing Corporation, Jacksonville, Fla., recently organized by C. H. Murchison, Barnett Building, and associates, has leased Roberts Building for new citrus fruit packing plant, with conveying and other mechanical-handling equipment.

Board of Regents, Southwest Texas State Teachers' College, San Marcos, Tex., plans erection of new manual arts building at local institution, to cost over \$65,000 with equipment. W. E. Ketchum, Pope Building, Austin, Tex., is architect.

Southeastern Development & Holding Co., Palatka, Fla., recently organized by A. M. Houston, president, Palatka Commercial Club, and associates, has secured property near Palatka for new mill for production of pulp and fiber products, to cost over \$150,000 with machinery. Henry Elwood Ellis, Jacksonville, Fla., is interested in new company.

R. E. Davis, 2823 Williams Street, Dallas, Tex., has plans for a one-story machine shop, to cost close to \$19,000 with equipment.

City Council, Miami, Fla., has secured about five acres near Opa Locka, Fla., as site for new municipal airport to cost over \$100,000. Hangar, repair shop and other field units will be constructed.

Town Council, Woodville, Miss., is asking bids until Oct. 7 for equipment for municipal light and power station, including a 180-kva. electric alternator, 15-kw. exciter, voltage regulator and accessory apparatus.

Dr. Pepper Bottling Co., Baton Rouge,

La., will install automatic bottling and capping machinery, conveying and other handling equipment in new two-story plant, to cost about \$55,000. Company is operating similar plants at Dallas, Tex., and other places.

Cleveland

PLANS are under way by Harbison-Walker Refractories Co., Farmers' Bank Building, Cleveland, for rebuilding plant at Sciotoville, Ohio, destroyed by fire several weeks ago, to cost about \$45,000.

Norcross Marble Co., Harvard Avenue and Jennings Road, Cleveland, has plans for a one-story addition, 60 x 225 ft., to cost about \$80,000 with equipment.

J. E. White Co., Negley, Ohio, operating clay properties, is planning construction of a new plant for manufacture of sewer pipe, etc. Unit will be of continuous kiln type and will cost over \$65,000 with machinery. P. J. Crowl will be in charge of construction.

Henly Cabinet Co., 757 Green Street, Toledo, Ohio, plans rebuilding part of plant recently destroyed by fire, with loss of about \$30,000 including equipment.

Following recent affiliation between Apex Electrical Mfg. Co., 1067 East 152nd Street, Cleveland, and Lorain Automatic Icer Co., 3953 St. Clair Avenue, first-noted company will arrange for production of a popular-priced electric refrigerator on a quantity basis, with steel-enameled exterior. Lorain company will manufacture certain parts of equipment. H. J. Walker, head of last-noted company, will supervise output.

Clark Controller Co., 1146 East 152nd Street, Cleveland, has acquired Sund Controller Co., Newark, N. J. Companies are expected to continue operation as separate plants.

Chapman-Stein Co., subsidiary of Cooper-Bessemer Corp., Mount Vernon, Ohio, will be taken over by Surface Combustion Co., Toledo, a subsidiary of Henry L. Doherty & Co. Mount Vernon company manufactures industrial furnaces, soaking pits and gas producers; Surface Combustion Co. manufactures gas-fired industrial furnaces. Chapman-Stein organization will be transferred to Toledo. It is stated that deal involved about \$500,000.

Milwaukee

GROUND has been broken by Butler Bin Co., Waukesha, Wis., manufacturer of steel bins, for a one-story shop extension, 80 x 100 ft.

Village Board, Grafton, Wis., has engaged Paul L. Clark, consulting engineer, 207 West College Avenue, Appleton, Wis., to prepare estimates and plans for municipal waterworks and sewerage system, to cost \$65,000. Richard Goldberg is president of Village Board.

American Black Granite Co., Ashland, Wis., is about to start work on improvements and extensions to cutting and polishing plant, requiring considerable new machinery, motors, etc.

J. I. Case Co., 500 State Street, Racine, Wis., manufacturer of threshing machines, tractors, etc., has begun work on improvements and enlargements of its main forge shop to cost about \$50,000. Work is being directed by Frank J. Hoffman, architect, James Block, Racine.

International Wire Works Co., Menasha, Wis., specializing in screens for paper and pulp mills, is erecting a \$30,000 shop addition, to be ready about Nov. 1.

Board of Vocational Education, West Allis, Milwaukee, has accepted bid of Pfeiffer Construction Co., 586 Sixty-sixth Avenue, for general construction of addition, or fourth unit, of West Allis manual training institute, to cost \$80,000.

Nordberg Mfg. Co., Milwaukee, manufacturer of Diesel engines, mining machinery, stone crushers, compressors, etc., reports business on books sufficient to continue night and day operation until at least Jan. 1. Payroll recently has been increased to exceed 1000, which is 15 per cent more than a year ago.

Kissel Motor Car Co., Hartford, Wis., manufacturer of passenger cars and trucks, funeral cars, hearses, etc., has been made defendant in friendly receiver-ship proceedings in Federal court at Milwaukee, and Carl F. Gellfuss, attorney, 425 East Water Street, Milwaukee, has been named receiver. Action is in form of a suit to foreclose a trust mortgage of \$750,000, dated April 1, 1922, upon which \$523,100 remains unpaid, in default of payment of semi-annual sinking fund sum of \$18,750 which fell due April 1, 1930. A financial reorganization is planned whereby present owners will continue in control and management, and production will be uninterrupted.

St. Louis

BOARD OF EDUCATION, 911 Locust Street, St. Louis, has filed plans for four-story mechanical shop, 100 x 150 ft., to cost over \$125,000 with equipment. Department of Architecture is in charge.

J. A. Werme Steel & Iron Co., North Indiana Street, Oklahoma City, Okla., will begin construction of a one-story addition, 30 x 90 ft., for storage and distribution, to cost about \$19,000 with equipment.

Gwin Drilling Co., Oklahoma City, Okla., has acquired oil refinery of Wewoka Refinery Co., Wewoka, Okla., and will develop for an initial capacity of about 1500 bbl. crude oil a day.

Peers McGlone Co., West Sixth Avenue, Pine Bluff, Ark., manufacturer of automobile bodies, has awarded general contract to E. C. Royse Construction Co., National Building, for one-story addition, 30 x 175 ft., to cost over \$40,000 with equipment.

Union Pacific Bus Transportation Co., Omaha, Neb., an interest of Union Pacific Railroad Co., has awarded general contract to Peter Klewit's Sons, Omaha National Bank Building, for two-story and basement bus terminal, repair and reconditioning shop, 150 x 300 ft., to cost over \$150,000 with equipment. James T. Allan and Noel S. Wallace, Brandeis Theater Building, are architects.

Sinclair Oil & Gas Co., Oklahoma City, Okla., has filed plans for extensions in oil storage and distributing plant, to cost over \$150,000 with equipment.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., will install an industrial arts department in new Stonewall Jackson junior high school for which bids are being received on general contract until Sept. 29, to cost \$265,000. Hawk & Parr, Hales Building, are architects.

American Eagle Aircraft Corporation, American Eagle Road, Kansas City, Mo., is arranging for a bond issue of \$500,000,

part of fund to be used for extensions and improvements for developing operations in all branches of airplane manufacture to make company an independent unit in line. It is also proposed to reduce present capitalization from 2,000,000 to 200,000 shares of stock, no par value. E. E. Porterfield, Jr., is president.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., is considering new electric-operated pumping plant for municipal water service, to cost about \$150,000 with machinery. Theodore Lelsen is superintendent.

Springfield Gas & Electric Co., Springfield, Mo., is planning extensions and improvements in artificial gas plant and system, including pipe line construction, to cost about \$200,000. B. C. Adams is vice-president and general manager.

City Council, Little Rock, Ark., is considering purchase of about 200 acres adjoining municipal airport for expansion, including additional hangars, repair shop and other units. About \$200,000 is available for project.

City Ice Co., Twenty-first and Campbell Streets, Kansas City, Mo., will make extensions and improvements in ice-manufacturing plant No. 1, to cost over \$50,000 with equipment. Charles A. Smith, Finance Building, is architect.

Cincinnati

WHILE fresh bookings of district machine tool manufacturers fail to show much of a gain, manufacturers feel encouraged by interest of consumers in checking back on previous quotations. Demand is still sluggish while inquiries continue in good number. Production is in keeping with the low demand.

Contracting Officer, Wright Field, Dayton, Ohio, will receive bids until Sept. 30 for 31,000 wing nuts, 582,500 plain brass grommets with washers, 1550 ball bearings, and 1600 self-locking padlocks; until Oct. 1 for 1,600,000 lock washers, 50,000 plain washers, 80,000 tinned steel burr washers, and 67,500 copper burr washers.

Plans are under way by Railway Supply & Mfg. Co., 1234 Harrison Street, Cincinnati, for remodeling factory unit, including installation of conveying and other equipment, to cost over \$40,000. Fechheimer & Ihorst, Provident Bank Building, are architects; Carl J. Klefer, Schmidt Building, is engineer.

Moore & Ross, Inc., 165 North Washington Avenue, Columbus, Ohio, dairy products, has plans for a one-story addition to power plant, 40 x 66 ft., with wing extension, 36 x 64 ft., to cost more than \$50,000 with boilers and other equipment. H. E. Eiselt, South High Street, is architect.

Memphis Natural Gas Co., Commercial Bank Building, Memphis, Tenn., is planning installation of equipment to increase capacity of pipe line from Monroe, La., to Memphis and vicinity, to cost \$60,000. D. C. Shaffer is general manager.

Public Service Engineering Co., Lexington, Ky., is planning development of gas properties in southeastern part of State, where 132,000 acres has been secured, and construction of pipe lines for natural gas supply to a number of districts, to cost more than \$7,000,000.

Dayton Power & Light Co., Dayton, Ohio, will issue bonds in amount of

\$5,058,000, part of proceeds to be used for extensions and improvements.

Board of Education, Ludlow, Ky., is considering installation of manual training equipment in new three-story and basement junior and senior high school to cost about \$200,000, for which bids have been asked on general contract. F. J. Porter, A. I. U. Building, 50 West Broad Street, Columbus, Ohio, is architect.

Cumberland River Sand Co., 10 Fatherland Street, Nashville, Tenn., has awarded general contract to Foster & Creighton, Fourth and First National Bank Building, for sand and gravel storage and distributing plant, including battery of 19 steel and concrete bins, with conveying, loading and other equipment, to cost over \$100,000.

Board of Education, Nashville, Tenn., is considering installation of manual training equipment in new three-story junior high school at North Nashville to cost \$175,000, for which bids have been asked on general contract. Marr & Holman, Stahlman Building, are architects.

Indiana

CONTRACT has been let by Hammond Lead Products Co., Hammond, to Fred C. Rowley, 611 Hohman Street, for one-story plant, 40 x 125 ft., to cost about \$40,000 with equipment.

American Foundry Co., Indianapolis, has work nearing completion on new plant at 1535 Naomi Street, to replace works on South Warman Avenue destroyed by fire several months ago. New foundry is scheduled for service in November and represents investment of over \$600,000 with equipment. Blaine H. Miller is president.

Northern Indiana Public Service Co., Hammond, has taken over electric light and power properties of Interstate Public Service Co., at Goshen and Monticello. Acquiring company plans expansion and betterments and will centralize operations with other properties.

Roach-Appleton Mfg. Co., 3440 Kimball Street, Chicago, manufacturer of electrical switch boxes and kindred products, has work under way on new one-story plant, 200 x 250 ft., at South Bend, to cost \$115,000 with equipment. Company will concentrate production at new location as soon as unit is completed. Fett, Pearson & Goffney, Associates Building, South Bend, are architects.

General Electric Co., Fort Wayne, has approved plans for steam power house, 50 x 80 ft., at local works, to cost about \$35,000 with equipment. Unit will be used in connection with new three-story and basement addition to cost about \$200,000 with machinery.

Officials of Terre Haute Boiler Works Co., Terre Haute, have arranged for a reorganization of company, with new capital of \$50,000 and 25,000 shares of stock, no par value. Expansion will be carried out for production of boilers, tanks and other products. Company is headed by William H. and Theodore S. Cliff, W. C. Ely and Charles L. Runyon.

Pacific Coast

CONTRACT has been let by American Rubber Producers, Inc., Salinas, Cal., to E. F. Reese, 153 Central Avenue, for new plant, with main structure 100

x 103 ft., to cost close to \$150,000 with machinery. Engineering department of company is in charge.

Hy-Vis Oil Refining Co., 424 Commercial Street, Los Angeles, has awarded general contract to J. A. Melton, 152 North Mariposa Street, for one-story addition to storage and distributing plant, to cost about \$30,000 with equipment. Kemper Nomland, Architects' Building, is architect.

Contractors' Machinery Exchange, 1135 Fifty-seventh Avenue, Oakland, Cal., has awarded contract to Austin Co. of California for one-story storage and distributing plant addition, to cost \$30,000 with equipment.

Whitman Metals Reduction Co., Tucson, Ariz., recently organized by H. L. Whitman, Tucson, and associates, has leased former engine house of El Paso & Southern Railroad Co. and will remodel for manufacture of copper and lead products under a special process, to cost over \$40,000 with machinery.

Baker Oil Tool Co., 2959 East Slauson Avenue, Huntington Park, Cal., manufacturer of oil well drilling tools and equipment, has awarded general contract to Brownell Construction Co., 2528 Slauson Avenue, for one-story addition, 65 x 116 ft., to cost about \$45,000 with equipment. Additional units will be built soon to provide total structure 65 x 577 ft., to cost over \$100,000. H. W. Charlton, address of contractor, is architect.

Tacoma Steel & Equipment Co., 2128 Pacific Avenue, Tacoma, Wash., has plans for a one-story building, primarily for storage and distribution, to cost \$30,000 with equipment.

Puget Sound Power & Light Co., Seattle, has plans for extensions and improvements in plant and system at Arlington, Wash., and vicinity to cost over \$100,000 with equipment. Company is also considering expansion and betterments at Snohomish, Wash., to cost about \$40,000. Company engineering department is in charge.

Truscon Steel Co., Call Building, San Francisco, with main works at Youngstown, Ohio, has plans for a one-story factory branch, storage and distributing plant, with crane and crane runway and other material-handling equipment, to cost about \$60,000. Engineering department of company is in charge.

Herrick Iron Works, Eighteenth and Campbell streets, Oakland, Cal., has acquired property adjoining plant and will use for expansion.

Foreign

ARRANGEMENTS have been made by A. Selberling Rubber Co., Akron, Ohio, manufacturer of automobile tires and other rubber goods, with Avon India Rubber Co., Ltd., Melksham, Wiltshire, England, for manufacture of products for trade in Great Britain. Plant will be extended and additional equipment installed. Work will be carried out under direction of William S. Wolfe, vice-president and factory manager of Selberling company, now in England.

Officials of Elektra, A. G., main subsidiary of Saxon Public Works, Inc. (Aktiengesellschaft Sachsische Werke), Halle, Saxony, Germany, have organized Landesgasversorgung Sachsen, A. G., with capital of 5,000,000 m. (about \$1,250,000), to operate artificial gas

plants and systems. New company will take over several existing properties in free states of Saxony and will carry out expansion.

Ford Motor Co., Dearborn, Mich., is considering early construction of new plant in France for production of same model cars as now produced in United States, including parts and assembling departments, to cost over \$1,500,000 with machinery. Henry Ford is now abroad and will select site.

Ministry of Public Works, Istanbul, Turkey, is arranging fund of £240,000,000 Turkish money (about \$118,000,000) for irrigation, water power, railroad and other public works construction. About \$45,000,000 will be used for irrigation of plains of An Kara (Angora), including

construction of dam at Burhanie; close to like amount will be used for construction of railroads between Samsun and Sivas, and from Adapazari, Duzce and vicinity to Bolu. Remainder of fund will go for port construction at Mersin and Filyos, including installation of elevating, conveying and other equipment. Entire program will be carried out over 12-year period.

United Chemical Industries of Soviet Union (Vsekhimprom), Moscow, Russia, has arranged with Koppers Co., Koppers Building, Pittsburgh, for technical assistance in construction of by-product coke works at Magnitogorsk, Southern Ural district, to be operated in conjunction with steel mill at that place. Coke plant will have ultimate capacity of 2,500,000 tons annually.

orifice burner. Various illustrations showing installations are included.

Glass Hoods, Plates and Cylinders.—Reynolds Electric Co., 2650 West Congress Street, Chicago. Bulletin 80 of eight pages, with price list, illustrating and describing color hoods, for use in theaters, public buildings, flood lights, street lights; color plates, for use in flood lighting of monuments, fountains, displays, buildings, airports, etc.; color cylinders, for wall brackets, lighting fixtures, lanterns, street lights, etc.

Electric Hoist.—Ambold Machine Tool Corporation, 50 Church Street, New York. Four-page circular describing the Demag Junior hoist—a high-speed hoist equipped with electric motor; it has a normal lifting capacity of 250 to 275 lb.

Tow-Boat Transportation.—Jones & Laughlin Steel Corporation, Pittsburgh. Booklet of 35 pages, interestingly illustrated, dealing with the company's shipments of manufactured steel products to customers in the South and Southwest via the Ohio and Mississippi Rivers and the railroads.

Steel Power Press Brake.—Long & Allstatter Co., Hamilton, Ohio. Bulletin PB-B of four pages, illustrating and describing a new steel power press brake. Specifications and data on standard machines are given.

Air Drawing-Oven.—General Electric Co., Schenectady, N. Y. Folder of four pages, describing and illustrating Type AD air drawing-oven for drawing carbon steel at temperatures up to 750 deg. Fahr. Advantages claimed are close, automatic control of temperature, product of uniform quality, reduced cost of subsequent operations and increased drawing speed.

Nitriding.—Hevi Duty Electric Co., Milwaukee. Bulletin No. 830, "Essentials of Successful Nitriding," offers a description of the elements of successful nitriding given in the light of the company's research, both in the laboratory and in regular production.

Ball Bearings.—Strom Bearings Co., 4535 Palmer Street, Chicago. Catalog No. 12 and data book, 192 pages, showing essential data applying to single-row radial, double-row radial, 200 per cent and 300 per cent angular contact and M. R. C. thrust bearings.

Flexible Couplings.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1887, containing complete descriptions, capacities, dimensions and weights of different types of Westinghouse-Nuttall couplings. Illustrations include applications of each type.

Electrical Tools.—Standard Electrical Tool Co., Cincinnati. New 64-page catalog, 8½ x 11 in., illustrated, describing various types of electrically-driven drills, grinders, buffers, polishers.

Electrical Sheets.—American Rolling Mill Co., Middletown, Ohio. Booklet descriptive of various grades of electrical sheets, with charts showing typical magnetization curves.

Iron Plates.—American Rolling Mill Co., Middletown, Ohio. Four-page folder, giving tentative specifications for open-hearth iron plates of flange quality. These specifications have been published for the purpose of bringing out criticisms and suggestions, which should be directed to V. H. Lawrence, Secretary of Commerce A-1 on Steel, Alan Wood Steel Co., Conshohocken, Pa.

New Trade Publications

Power - Transmission Belt.—Allis-Chalmers Mfg. Co., Milwaukee. Folder of four pages, devoted to a description of Texrope drives for industrial use. They are said to be vibrationless, shock-absorbing, clean, and to require little attention.

Alloying Electrodes.—Alloy Welding Processes, Ltd., Ferry Lane Works, Forest Road, London, England. Bulletin 60 of eight pages dealing with special alloying electrodes for welding corrosion-resisting and heat-resisting steels and alloys.

Lubrication.—Lubrication Devices, Inc., Battle Creek, Mich. Booklet of 12 pages, dealing with the new Farval dual line system of lubrication, which is said to be especially adapted to steel mill and other heavy-duty equipment.

Conveyor Roll.—Lamson Co., Syracuse, N. Y. Ten-page bulletin, illustrating and describing a newly developed conveyor roll which is made entirely of one piece, the head being a continuation of the roll itself, swaged in and back to form a concentric support for the bearing.

Synchronous Motors.—General Electric Co., Schenectady, N. Y. Two folders of four pages each, illustrating and describing "7500 series" and "7600 series" of general-purpose, continuous duty synchronous motors, suitable for loads whose torque requirements can be successfully met by a standard squirrel-cage induction motor.

Recording Instruments.—Gaertner Scientific Corporation, 1201 Wrightwood Avenue, Chicago. Bulletin 122 of four pages describing a new speed indicator, a hand tachometer, vernier caliper, laboratory blow torch, and analytical balance and thermometer. Prices are included.

Mechanical-Drive Turbines.—General Electric Co., Schenectady, N. Y. Four-page folder, illustrating and describing mechanical drive turbines of 5 to 50 hp. This turbine can be arranged for practically any steam pressure up to 250 lb., with or without super-heat, and for various mechanical applications.

Chronographs and Accessories.—Gaertner Scientific Corporation, 1201 Wrightwood Avenue, Chicago, Ill. Catalog B of 24 pages, illustrating and describing various recording instruments—tape chronographs, drum chronographs, printing chronographs, recording drums and accessories, reg-

ulator clocks and chronometers, stop watches, interval timers and recording papers.

Heat-Treated Carbon Steels.—Wallace Barnes Co., Bristol, Conn. Seven-page bulletin dealing with heat-treated carbon steels available for spring designers.

Oil-Storage Tank.—Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago. Booklet of 10 pages describing "Hortonspheroid," a new type of oil storage tank to withstand internal pressure. Natural gasoline and other volatile liquids are stored in it without evaporation loss, even though the liquid boils at normal temperatures.

Electric Heat-Treating Furnaces.—Holcroft & Co., 6545 Epworth Boulevard, Detroit, Mich. Catalog of 30 pages, attractively illustrating and briefly describing various types of pusher and conveyor furnaces for heat-treating and compensating carbonizing electric furnaces.

Switching Locomotives.—George D. Whitcomb Co., Rochelle, Ill. Four-page folder, illustrating and describing an oil-electric locomotive for switching in both industrial and railroad service. They are made in sizes 2 to 100 tons.

Trolley Wheel.—Matthews Mfg. Co., Worcester, Mass. Circular describing standard 4-in. I-beam trolley wheel, which has been added to the company's line of unground ball-bearing units.

Electric Induction Steel.—Heppenstall Co., Pittsburgh. Bulletin of 12 pages, devoted to the electric induction principle as applied to high-quality tool steels. Advantages featured are: elimination of gaseous atmosphere; high-frequency induction melting is accomplished in the absence of carbon or carbon electrodes; complete dissemination of all chemical elements, etc.

Air-Compressors.—Westinghouse Air Brake Co., Wilmerding, Pa. Catalogs T-2047 and T-2048, of 23 pages and 36 pages, respectively, covering several types of the Westinghouse-Nation line of motor-driven compressors, and describing several mechanical improvements incorporated in these compressors.

Adjustable Orifice Burner.—Ashmead-Danks Co., 7016 Euclid Avenue, Cleveland. Bulletin of seven pages, presenting the "A and D" adjustable

Proposed British Council of Industry Would Aid Empire Trade

(By Cable)

LONDON, ENGLAND, Sept. 22.

A GROUP of prominent industrialists has proposed the formation of a national council of industry and commerce to urge protection and inter-Empire trade, the council to be headed by Sir William Morris, Lord Melchett, Sir Harry McGowan, Cunliffe Owen, Benjamin Talbot and others. Their announcement says that the British people are tired of waste, extravagance, successive governments and slavish adherence to political parties and economic theories, which have lost all relation to the facts of modern business life.

Pig Iron Stocks Smaller

Iron and steel are still quiet with blast furnaces reducing stocks gradually. Consumers of pig iron are limiting purchases to immediate needs in expectation of lower prices, but the possibility of cheaper iron is limited by the probable upward tendency in the price of fuel.

Finished iron and steel is very dull with mills especially in need of shipbuilding specifications. Most mills are operating only part time.

The Continental iron and steel market here is quiet following the recent spurt in semi-finished material buying, and as works are still in need of orders, the price decline is unchecked.

The Continental Steel Cartel is proposing a new system of fines by returning to the original penalty of \$4

British Industrialists urging industrial council say people are tired of waste and adherence to parties and political theories.

* * *

European meeting in November will seek to reestablish semi-finished sales cartel, and may revise overproduction penalties.

* * *

Ford motor plant at Cologne, Germany, to begin operation in March with annual output of 40,000 cars.

by important sellers. Black sheets continue quiet.

Higher Indian Sheet Duty

The Indian Government has decided to pay the Tata Iron & Steel Co. an additional 15 rupees a ton on rails purchased as from last April and is considering proposals to increase the duty on galvanized sheets.

Yarrow & Co., Ltd., of Glasgow, with others, has acquired an interest in the Kraljevitza shipyard in Jugoslavia and will build vessels there.

Luxemburg production in August was 197,000 metric tons of pig iron and 177,000 tons of raw steel. At the end of August 27 furnaces were in blast.

British to Confer on New Building Code

LONDON, ENGLAND, Sept. 12.—A conference expected to have a permanent influence on the future of British building construction by leading to the adoption of standard practice is to be held at the Institution of Civil Engineers, London, in October. The conference has been called by the State Department of Scientific and Industrial Research, which a year ago appointed the Steel Structures Research Committee to review present methods and regulations for the design of steel structures, including bridges, investigate the application of modern theory of structures

per ton for excess output, to be applied when any member country exceeds its allotment.

The tin plate market is awaiting the result of the Welsh makers' meeting on Tuesday, when a price reduction is considered possible. Heavy merchant sales of tin plate are recorded at 17s. 6d. (\$4.25) per base box, f.o.b. works port. The industry is generally well engaged on the basis of its restricted output, provided present world consumption is maintained.

British galvanized sheet makers have reduced their minimum prices 5s. (\$1.22) per ton to £11 12s. 6d. per ton (2.52c. per lb.) for all markets except India. The Indian market is free and £12 10s. per ton (2.72c. per lb.), cost and freight, is being named

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export. £11 10s.			\$55.95
Billets, open-hearth..... 5 15	to	£6 5s.	27.98 to \$30.41
Black sheets, Japanese specifications..... 12 5			59.61
Tin plate, per base box.. 0 17½	to	0 18	4.32 to 4.38
			Cents a Lb.
Steel bars, open-hearth.. 7 15	to	8 5	1.69 to 1.79
Beams, open-hearth.... 7 7½	to	7 17½	1.60 to 1.71
Channels, open-hearth... 7 12½	to	8 12½	1.66 to 1.87
Angles, open-hearth.... 7 7½	to	7 17½	1.60 to 1.71
Black sheets, No. 24 gage 9 10	to	9 15	2.06 to 2.12
Galvanized sheets, No. 24 gage..... 11 12½			2.52

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2 12½s. to	£2 13s.	\$12.66 to \$12.90
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Billets, Thomas (nominal)	3 12½	to	3 13	17.64 to 17.76
Wire rods, low C., No. 5 B.W.G.	5 2½	to	5 7½	24.94 to 26.15
Rails, light	6 0			29.20
Black sheets, No. 31 gage, Japanese.....	11 5	to	12 12	54.68 to 58.32
				Cents a Lb.
Steel bars, merchant....	4 6			0.95
Steel bars, deformed....	4 10	to	4 11	0.99 to 1.00
Beams, Thomas, British standard (nominal)...	4 3	to	4 4	0.94 to 0.95
Channels, Thomas, American sections	5 12	to	5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ½-in. thick	4 6	to	4 7	0.95 to 0.96
Angles, Thomas, 3-in....	4 0	to	4 1	0.88 to 0.89
Hoop and strip steel over 6-in. base.....	4 19½	to	5 0	1.09 to 1.10
Wire plain, No. 8 gage..	5 17½			1.29
Wire, barbed, 4-pt. No. 12 B.W.G.	9 15			2.11
Wire nails, base.....	5 17½			\$1.29 a keg

to steel design, and to make recommendations for more efficient and economical design.

Krupp Licensees May Be Granted Export Rights

ESSEN, GERMANY, Sept. 9.—Consideration is being given to extending the present licensing agreements on "Nirosta" chrome-nickel steel and Widia metal, made by American companies, to include export trade. An extension of certain export markets to licensees under the Krupp patents has already been arranged on dies for wire and tube drawing, an American licensee having been granted the right to export exclusively to Mexico, Canada and France.

French Building 40,000-Ton Tube Mill

PARIS, FRANCE, Sept. 11.—A steel tube mill with an annual capacity of about 40,000 tons, a large part of the output to be sold for export, is being constructed at Aulnoy in Northern France by Louvroillet & Recquignies, tube makers, with main office in Paris. In conjunction with the Société Anonyme des Tubes Denain-Anzin, the company has established a steel tube export organization which will operate as the Vallourec S. A., with headquarters in Paris.

Europe May Reestablish Steel Sales Cartel

HAMBURG, GERMANY, Sept. 11.—A meeting of the Continental steel producers, Nov. 1, will endeavor to reestablish a price cartel on semi-finished material, bars and beams. The recent effort to handle all sales of these products through a central sales office failed completely, and it appears doubtful that the proposed negotiations for a new agreement will meet with success.

Ford Plant in Germany to Produce 40,000 Cars

COLOGNE, GERMANY, Sept. 9.—The new plant for the Ford Motor Co., scheduled to begin operation next March, is expected to produce about 40,000 cars annually. It is claimed that 90 per cent of this output will be with German labor and materials.

Plans Ready for Second German Battleship

KIEL, GERMANY, Sept. 9.—Plans for the construction of the second Ersatz Preussen, battleship of 10,000 tons, permitted to Germany under the Treaty of Versailles, have been completed and work will begin if the Reichstag passes the bill calling for

its construction. The first ship of this type will be launched in a few months. Plans for the second vessel, which will also be electrically welded, include the use of a substantial tonnage of stainless steel and light metal alloys for the interior and new type armor plates of zirconium alloy steel.

End of Steel Cartel Expected Soon

WASHINGTON, Sept. 23.—The Continental Steel Cartel has been prolonged to the end of the current year, as stated in THE IRON AGE, Sept. 18, page 825, but according to a cablegram from Acting Commercial Attaché Daniel J. Reagan, Paris, the extension is provisional.

Early dissolution of the entente is foreseen because of the wide discrepancy in viewpoint exhibited at a stormy meeting at Liège, Belgium, last week. Production of raw steel, control of which was the original function of the Cartel, has been curtailed an additional 25 per cent, according to one report and 15 per cent according to another. Success of this curtailment has been greatly discounted because of the Cartel's failure to keep producers in line even in the national organizations.

Russia Buys German Tubes

HAMBURG, GERMANY, Sept. 11.—Orders placed by the Soviet Government with German tube mills totaled 30,400 tons in August. All purchases will be executed for shipment this month. Mills are now negotiating with the Soviet for further orders on lap-welded and seamless tubes totaling 20,000 to 25,000 tons.

Operation of 54-In. Cupolas Discussed at Detroit

Tentative recommendations of the American Foundrymen's Association for the operation of 54-in. cupolas were discussed at a round table conference in connection with the monthly meeting of the Detroit Foundrymen's Association on Sept. 18. The discussion revealed an almost even division of opinion among members as to whether cupolas should have a boshed or straight lining.

Fred J. Walls, Wilson Foundry & Machine Co., Pontiac, Mich., had charge of the session. Those participating in the meeting included Henry M. Lane; Russell Scott, Packard Motor Car Co.; Harry W. Dietert, United States Radiator Corporation; Robert Crawford, Atlas Foundry Co.; Kurt C. Babo, Dodge Brothers, Inc.; William J. Muhltner, Great Lakes Foundry Sand Co.; and Vaughan Reid, City Pattern Works. James L. Mahon, American Car & Foundry Co., president of the association, presided at the meeting.

Exhibit of Useful Arts Opens in New York

An exhibition tracing the industrial history of mankind has been opened in the News Building, 220 East Forty-second Street, New York, in the new quarters of the Museum of the Peaceful Arts. The exhibition will be open to the public, without charge, until Nov. 15. More than 200 companies and individuals of national standing have been included in the museum's story of "Men and Machines."

Among the exhibits in the form of models, machines or graphic devices are shown early and modern locomotives, telephones, textile and agricultural machinery, presses and printing accessories, sewing machines, automobiles, airplanes, bicycles, radio apparatus, engines of various types and a multitude of auxiliary equipment.

One interesting exhibit is the original Putnam lathe, which was built in 1836. The entire frame is of wood. A light iron rail provides a track for the travel of the carriage and of the rear head. Power was applied by a foot treadle. Another interesting but more recent piece of apparatus is the earliest turret lathe of the horizontal turret type.

Still another is the first Parsons steam turbine ever seen in the United States. This was brought from England about 1895, was used as the basis of the Westinghouse turbine development and then in 1900 was sent to the experimental laboratory at Cornell University. It is of 200 hp.

A model of the first telephone transmitter, with successive models of later instruments, carries the exhibit up to the present in 21 stages. There are a number of panels along one wall on which mechanical motions, such as cranks, gearing, pistons, etc., are shown in section and in operation. Each panel has a small motor so that from a dozen to a score or more of motions are operating at once. This should have considerable educational value.

The exhibit falls into two major time units—before 1780 and since that date. The first shows the character and status of mechanical capacity up to the beginning of the early machines. The second shows the development of those machines to the forms in which we now know them.

In its new location the museum has almost 40,000 sq. ft. of area, of which roughly 33,000 sq. ft. is in the exhibit rooms and the shops adjacent thereto. The scheme is comprehensive, about half of the space being customarily open to the public, while in the remaining half there will be certain permanent exhibits and the opportunity for preparing special exhibits to be shown from time to time. Each such special exhibit will have a definite motive back of it, and these will be announced as they come along.

It is planned to change the name to Museum of Science and Industry.

Current Statistics of Business

August Motor Car Output Lowest Since December

WASHINGTON, Sept. 23.—Dropping 39,317 units, the output of motor vehicles in August in the United States was 223,046, against 262,363 in July, and was the lowest since last December, when 120,007 were produced. August production of passenger cars was 187,037, a decline of 35,422 from July's total of 222,459. Truck output was 35,758, a decrease of 3905 from the July total of 39,663. The August output of taxicabs was 251 as against 241 in July.

In eight months of 1930, motor vehicle production was 2,704,957, a drop of 1,519,954 from that for the like period of last year, with a total of 4,224,911. Passenger cars aggregated 2,304,502, a decline of 1,324,519 from the 3,629,021 in 1929. Motor truck production totaled 395,442, a drop of 187,721 from the 583,163 of 1929.

Output of motor vehicles in Canada in August declined to 9792 from 10,188 in July. Passenger car production fell to 6946 from 8556. Truck output was 2846, increasing from 1632 in July.

For the first eight months, production in Canada totaled 130,665 units, against 220,036 in the like period of last year. Passenger car production was 108,861, compared with 176,250, while motor truck output was 21,804, against 43,786.

Steel Barrel Output Lowest in 20 Months

WASHINGTON, Sept. 23.—Production of steel barrels in August totaled 553,842 units, representing 39.6 per cent of the capacity of the 27 companies with 32 plants which reported

to the Department of Commerce. July output was 617,420 barrels, or 44 per cent of capacity. August shipments were 552,265 barrels, against 621,091 in July.

Stocks at the end of August were 74,138 barrels, compared with 72,561 at the end of July. Unfilled orders at the end of August for delivery within 30 days were 237,745 barrels, against 311,630 at the end of July. Unfilled orders for delivery beyond 30 days were 876,335 barrels, compared with 984,224.

Production was the smallest since that of December, 1928, and shipments the lowest since January, 1929. Unfilled orders were the smallest since November, 1928.

Wholesale Prices Remain Stationary

Commodity prices reported upon by the United States Bureau of Labor Statistics showed an index of 84 for August, which is precisely the same as that for July. Thus, the steady decline which has been under way without interruption since July, 1929, appears to have been arrested. The index in August, 1929, was 97.7, while in July, 1929, it was 98. These were the two highest months since September, 1928.

During the month the various components of the index showed divergent trends. Farm products and foods were the only ones of the 10 major groups which recorded increases. Fuels remained stationary. The other seven groups all declined.

Metals and metal products dropped from 94.3 in July to 92.7 in August, reaching the lowest figure by far since the bureau began quoting on the basis of 1926 prices as 100. Iron and steel dropped from 90.7 to 90.1;

non-ferrous metals, from 73.5 to 72.7, and automobiles, from 105.5 to 102.5. Agricultural implements and other metal products remained stationary, at 94.9 and 98.4 respectively.

Shipments of Galvanized Sheet Metal Ware Gain

WASHINGTON, Sept. 20.—Shipments of enameled sheet metal ware in July represented 213,420 doz., valued at \$858,774, compared with 247,861 doz., valued at \$996,270 in June and 290,532 doz., valued at \$1,097,956, in July of last year, according to reports received by the Department of Commerce from 16 manufacturers, comprising approximately 80 per cent of the industry.

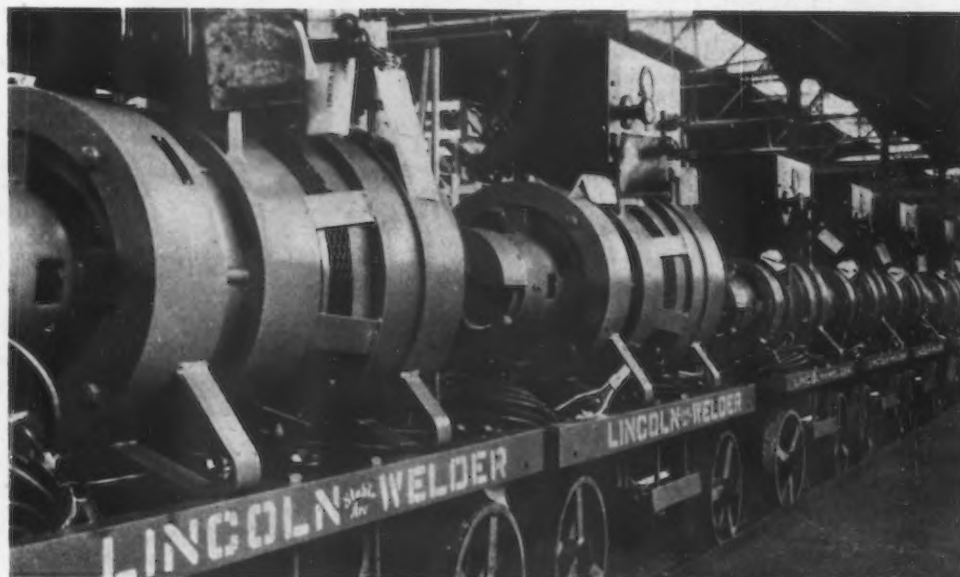
Shipments of galvanized sheet metal ware in July were 137,970 doz., valued at \$523,970, compared with 116,096 doz., valued at \$503,304 in June and 153,958 doz., valued at \$628,545, in July of last year, according to reports from 14 concerns, comprising a large proportion of the industry.

Building Still Declining

Permits for building in 585 cities and towns all over the United States are reported for August by S. W. Straus & Co. at \$160,791,000. This continues the decline, showing a drop of 15 per cent from the \$188,939,000 in July. Compared with August, 1929, the drop was 37 per cent from \$255,082,000.

After adjusting for seasonal and trend factors, the August total is estimated at 18.4 per cent below normal. The similarly adjusted July index was 13.1 per cent below normal, while that for August, 1929, was 3.4 per cent below normal.

STRAIGHT-LINE production is being applied in many fields outside of the automotive industry. The illustration shows the assembly and final inspection line for arc welders in the plant of the Lincoln Electric Co., Cleveland



Non-Ferrous Ingot Prices and Deliveries

CHICAGO, Sept. 19.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of six principal mixtures of ingot brass during the 28-day period ended Sept. 12.

These statistics will have to be gathered and reported on the basis of "Commercial Grades" until the revised specifications for copper base alloys in ingot form for sand castings, adopted as tentative specifications by the American Society for Testing Materials during the summer of 1930, are in sufficiently general use to enable the gathering of statistics on a strict specification basis.

	Cents
Commercial 80-10-10 (1 per cent impurities)	12.071
Commercial 78 per cent metal	10.294
Commercial 81 per cent metal	10.751
Commercial 83 per cent metal	10.783
Commercial 85-5-5-5	11.128
Commercial No. 1 yellow brass ingot	8.521

The combined deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Metal Institute for August amounted to 5800 tons. In July they were 5920 tons, with 6133 tons in June. The high month this year was 6898 tons in February.

On Sept. 1 unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to 19,298 net tons. On Aug. 1, the unfilled orders were 20,325 tons, with 17,516 tons and 17,349 tons on July 1 and June 1, respectively.

River Shipments of Steel Fall Off in August

River shipments of iron and steel products on the Ohio River in the Pittsburgh district during August amounted to 107,948 net tons, according to the United States Engineer office, Pittsburgh. This compares with 147,558 net tons in July and with 137,734 tons in August, 1929.

On the Monongahela River 96,496 tons of steel was moved last month, compared with 132,161 tons in the preceding month and 134,426 tons in August, 1929. Allegheny River shipments totaled 2600 tons in August, 1930, compared with 1125 tons in July and only 100 tons in August of last year.

Sheet Output and Sales at Year's Low in August

There was a gain of more than 5 per cent in shipments of steel sheets in August by independent mills, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. Shipments during the month were 205,774 tons, compared with 194,767 tons during July. However, sales declined sharply and production fell off somewhat from the previous month. Both

sales and production during August were at the low point of the year. Sales during the month were 148,969 tons, compared with 207,400 tons in July, and production was 173,956 tons, against 186,206 tons during the previous month.

With increase in shipments and decrease in sales and production, tonnage on the books Sept. 1 was materially reduced from the first of the previous month, having been 373,148 tons, or considerably less than at any previous time during the year. The July report and comparisons in net tons follow:

Net Tons	August	July	June
Sales	148,969	207,400	187,412
Production	173,956	186,206	205,675
Shipments	205,774	194,767	212,930
Unfilled orders	373,148	432,298	431,324
Unshipped orders	99,925	119,974	116,601
Unsold stocks	82,315	82,708	83,988
Capacity per month	529,600	546,500	517,200
Percentage reporting	67.6	67.6	67.6

Percentages, Based on Capacity	August	July	June
Sales	41.6	56.2	53.6
Production	48.6	50.4	58.8
Shipments	57.5	52.7	60.9
Unfilled orders	104.3	117.0	123.3
Unshipped orders	27.9	32.5	33.3
Unsold stocks	23.0	22.4	24.0

Smaller Ore Consumption in August

Consumption of Lake Superior ores in August, by Lake-front furnaces and Eastern and Central district furnaces is reported by the Lake Super-

rior Iron Ore Association at 3,673,161 gross tons. This represents a decline of more than 4 per cent from the 3,837,567 tons consumed in July. Compared with August, 1929, when 5,779,139 tons was used, the reduction is about 40 per cent.

Ore on hand at furnaces Sept. 1, is placed at 29,397,236 tons. In addition, ore on Lake Erie docks is figured at 5,540,776 tons. The total of 34,938,012 tons is more than 3 per cent above the 33,830,946 tons on hand at furnaces and docks Sept. 1, 1929.

A total of 251 furnaces is represented in the above figures. Of these, 123 were in blast on the last day of August, compared with 130 on the last day of July. One Canadian Lakefront furnace is included.

Detinning Plants Secured Large Yields in 1929

WASHINGTON, Sept. 22.—Detinning plants in the United States treated 221,643 gross tons of clean tin plate clippings in 1929, an increase of 17,443 tons over 204,200 tons treated in 1928, according to the Bureau of Mines, and the yield rose to an average of 31.9 lb. per ton of scrap from 30.3 lb. The total pig tin recovery was 8200 net tons, against 7400 tons. No old tin coated containers were treated for the tin coating in 1929, though some were remelted for window weights.

The value of eight nonferrous metals recovered from secondary sources last year was reported as \$331,027,900, which is \$56,416,600 more than in 1928. The bureau report said this increase in total value was almost entirely due to the greater recovery and higher yearly average price of copper and copper alloys in 1929. There were also increases in the average prices of lead and zinc and decreases in the average prices of antimony and tin. There was a large increase in the quantity of secondary copper and brass and small increases in the quantity of secondary lead and secondary aluminum.

Shipments of scrap copper and brass to Europe were considerably less in 1929 than in 1928 and the brass scrap remelted by secondary refineries did not increase. The large increase in secondary copper was in that reported by smelters and refineries that treat mainly primary metal, which increased to 167,079 tons in 1929 from 116,323 tons in 1928, and in copper in alloys other than brass, which increased to 120,000 tons from 95,000 tons.

"As most of the dealers and secondary smelters operated cautiously in 1929 and the turn over of scrap metal in the domestic market was larger than normal in many lines, the business was the most profitable one for several years," the report stated. "Foundries undoubtedly purchased a larger percentage of secondary ingot and scrap copper and copper alloys, owing to the high price of copper."



Electric arc welder at work inside a large circuit breaker at the Philadelphia plant of the General Electric Co.

Some Aspects of High-Pressure Natural Gas Transportation

IN an extensive paper read in Chicago last February, R. S. Lord, president, Hope Engineering Co., Mt. Vernon, Ohio, told the members of the Western Society of Engineers a good many things about high-pressure natural gas transportation. This paper was then discussed by Herbert R. Davis, consulting engineer, Buffalo, who showed by means of diagrams some of the limiting conditions in transporting natural gas over long distances in pipe lines.

What follows is a brief abstract of Mr. Lord's paper. He began with a discussion of the composition and other characteristics of natural gas. He sought thereby to show why it is worth the cost of transporting it great distances at high pressure. Not only is the heating value of ordinary natural gas practically double that of the best manufactured gas, but it is customary to sell it at prices approximately one-half those of manufactured gas.

Natural gas is an industry which reached a consumption, in 1928, of 1,568,139,000,000 cu. ft., delivered through 60,000 miles of pipe lines. This gas is equivalent to 60,000,000 tons of coal, on the basis of heat units, without taking into account the difference in efficiency of burning or other particular advantages of gas.

This was an increase of about 8 per cent over 1927, about 55 per cent in the five-year period from 1923 to 1928 and about 115 per cent in the ten-year period from 1918 to 1928.

For 1929 the American Gas Association estimates consumption at 1,890,000,000,000 cu. ft., an increase of more than 20 per cent over 1928.

These figures are several times those for manufactured gas, which, according to the same association, were 535,000,000,000 cu. ft. in 1929, an increase of about 8 per cent over 1928.

Large extensions in the use of natural gas have been furthered by laying down new pipe lines.

A natural gas pipe line has been completed from the Monroe gas field in northern Louisiana, crossing the Mississippi River and extending to Birmingham, Ala., and Atlanta, Ga., a distance of nearly 500 miles. A similar line from Louisiana to St. Louis, about 450 miles, is now in operation. These two lines will probably deliver, when in full operation, about 250 million feet a day.

Denver, Salt Lake City and San Francisco are now furnished with natural gas from distant points, and the line to San Francisco is being doubled. Practically all cities and towns located near natural gas fields use it as a fuel.

Modern Cost Work Shows Its Profit Possibilities

(Concluded from page 835)

Thinking that this surprisingly low percentage showing of the machines actually at work might be an exception, the cost engineer made a similar check-up twice a day for several days. He found that this low utilization practice seemed to be the rule and not an

exception. Taking his findings up with the works manager resulted in the installation of a system for recording idle time that boosted the machine utilization factor from 20 to 25 per cent. This was equivalent to an increase in production capacity of 25 per cent for the machines involved without any increase of the labor cost.

As soon as the operators found that all their time was being watched by the cost department and reported to the works office, they began to watch it themselves with respect to their own machines. If they were delayed because of transportation facilities or other services not in their control instead of placidly accepting the situation as formerly they made it a point to report the matter at once. This in turn put pressure on the auxiliary services which led to an increase in their efficiency.

It would be futile to try to enumerate the various directions in which special investigations by the cost department can profitably be made. They are limited only by the degree of imagination and initiative contained in the department. The first step is to see that these qualities are present, the second is to make it known that studies and suggestions are expected from it above and beyond matters of established routine.

A visitor who was walking through the body plant of the Ford Motor Co. at Fordson some years ago noticed a large number of burlap bags filled with small pieces of wood. Inquiry led to the fact that these chunks of wood, the trim and waste resulting from cuttings of body parts, were too small to utilize anywhere in connection with car production; yet, in Mr. Ford's opinion, too good to burn. Being averse to economic waste of any kind he wanted them used for some good purpose, if not in his own plant, then elsewhere. It was up to the department management to find ways and means for the utilization of this material and the steady growth of the pile of bags furnished the stimulus for quick action in so doing to avoid being "snowed under."

Perhaps it would be a fine thing if we could apply the same principle to the mass of data which enters the average cost department. Instead of having it go into the files to be forgotten, we might insist that such of it as could not be profitably utilized must be put into bags and allowed to accumulate in the open where the management could see it!

Working Conditions Feature Layout of New Tool Plant

(Concluded from page 853)

under one rear corner of the shop. Mine slack coal is fed through a mechanical stoker, the hopper of which is filled several times a day.

Special Attention Given to Illumination

A striking feature of the plant is its remarkable daylight illumination. All windows with southern exposure are fitted with special translucent glass which keeps out the glare and direct rays of the sun. The side-wall windows, in addition, are provided with Aerolux aluminized Venetian shades. The edges of the narrow slats are so shaped that they reflect light

Business as Others See It

Digest of Current Financial and
Economic Opinion

BETTERING of sentiment is proceeding apace, to judge from widespread comments, from many observers. Improvement in retail sales is noted by *Analyst*, *Business Week*, citing the "shopping revival", looks to the incidence of orders to fill rapidly depleting retail shelves. *Commerce and Finance* judges that September is a better barometer than August, and says that "the next period of activity seems to be approaching with as much rapidity as could be expected."

Adequate credit and a low interest rate will persist through the fall and early winter, in the opinion of Irving Trust Co., New York. That business men are now largely looking after their own businesses is a good augury found by *Financial Chronicle*—"After all," says that paper, "it is our individual initiatives, enterprises and energies that shall by competition and coa-

lescence lift us out of our slough of despond."

Believe Worst Is Behind Us

That the low point of the present movement was reached (and passed) in August is a common belief. Developments since then have been mixed. One commentator finds "all indexes showing that the downsweep of commodity prices has been stopped," and points to the larger figures for consumption of electrical energy for power purposes, in manufacturing plants.

But Brookmire is doubtful. Both that service and *Analyst* have business indexes showing a disquietingly close parallel between the present depression and that of 1921. And the former raises the question "whether the probabilities favor a rather quick recovery, or whether there may not be a period of some months before a sustained upturn can be expected."

Many manufacturers, the Union Trust Co., Cleveland, finds, "feeling that raw material prices are at the bottom, have resumed buying upon a larger scale." It points to the fact that savings deposits have been increasing steadily during the year as an indication that there is no dearth of buying power, once the public gets over its "buyers' strike."

Improvement Already Brewing

Forces are at work which will ultimately cause business to emerge from depression, in the view of Harvard Economic Society. These include the upturn in commodity prices, the factor of seasonal expansion, extreme ease in money, and the fact that production has been lagging behind retail distribution. It is usual, says that authority, for an increase in volume of business to precede a sustained rise in prices.

into the room without admitting the sun's direct rays. Artificial lighting is furnished by 200-watt lamps spaced 10 x 10 ft. and 8 ft. high. These are supplemented by individual lamps on jointed fixtures and fitted with opaque metal shades. There is no glare and there are no shadows.

Floors of the shop consist of two layers of wood laid on a cement base and finished with Permatite floor dressing and cleaned by dry scrubbing. The dry scrubbing is done by means of mineral wool entwined about the bristles of a rotating brush machine. After the dry scrub, the fine scrapings are swept up. The floors make an excellent appearance and are hard and durable.

All machines and tool racks in the shop are painted standard machine gray, the wainscoting a dark green, and the walls and ceiling white. Since the shop is practically free from dust, dirt or smoke, the painted surfaces do not become spotted or dingy looking, with the result that the plant presents an almost immaculate dress to visitors. The management believes that this atmosphere of quietness, cleanliness and cheerfulness has a favorable reaction on the workmen so that they are fully satisfied with their surroundings and therefore do better work.

Aside from the efficient, and in many ways unusual, layout and equipment of this plant, the company's relationship with its men is worthy of examination. Foremen do not meet at stated intervals as they do in many plants. They get together, instead, whenever a problem comes up deserving attention. In a small shop, of course, the foremen are constantly in close touch with each other and with the management and can gather informally on short notice. Such gatherings, at which every foreman feels at ease and expresses his best judgment, have proved more effective than stated meetings where the formal conduct

of a program unconsciously imposes a feeling of restraint.

Almost All Employees Participate in Bonus System

In setting up a successful bonus system the company has taken ideas from various bonus plans used in this country and combined them with original ones which experience has shown best suit the Goddard & Goddard plant. Practically every employee, except office girls and janitors, participates in the bonus. Briefly, the system is divided into the following five classifications:

- (A)—Bonus to DIRECT LABOR (individual) based on allowed time for a given operation.
- (B)—Bonus to INSPECTORS (group) based on an allowable ratio of inspection time to direct labor time for a weekly period.
- (C)—Bonus to ENGINEERING DEPARTMENT (group) based on an average allowable time per order (determined by experience) for all work passing through this department for a four-week period.
- (D)—Bonus for INDIRECT LABOR (individual) covers maintenance and repair men and men working on unusual jobs—based on allowed time per job.
- (E)—Bonus to SUPERVISORS (group) includes all foremen and certain others in responsible positions—based on total gross sales for the month divided by total factory payroll for same period. The disbursement of the supervisors' bonus on a share-and-share-alike basis has resulted in team work of all departments to an unusual degree.